ENGINEERING NEWS-RECORD

MAY 29, 1958

First Quarterly Roundup: **Construction Cost And Estimating Guide**

Featuring Building Indexes & Unit Costs p. 33

Are U. S. airports ready for jet-age traffic?

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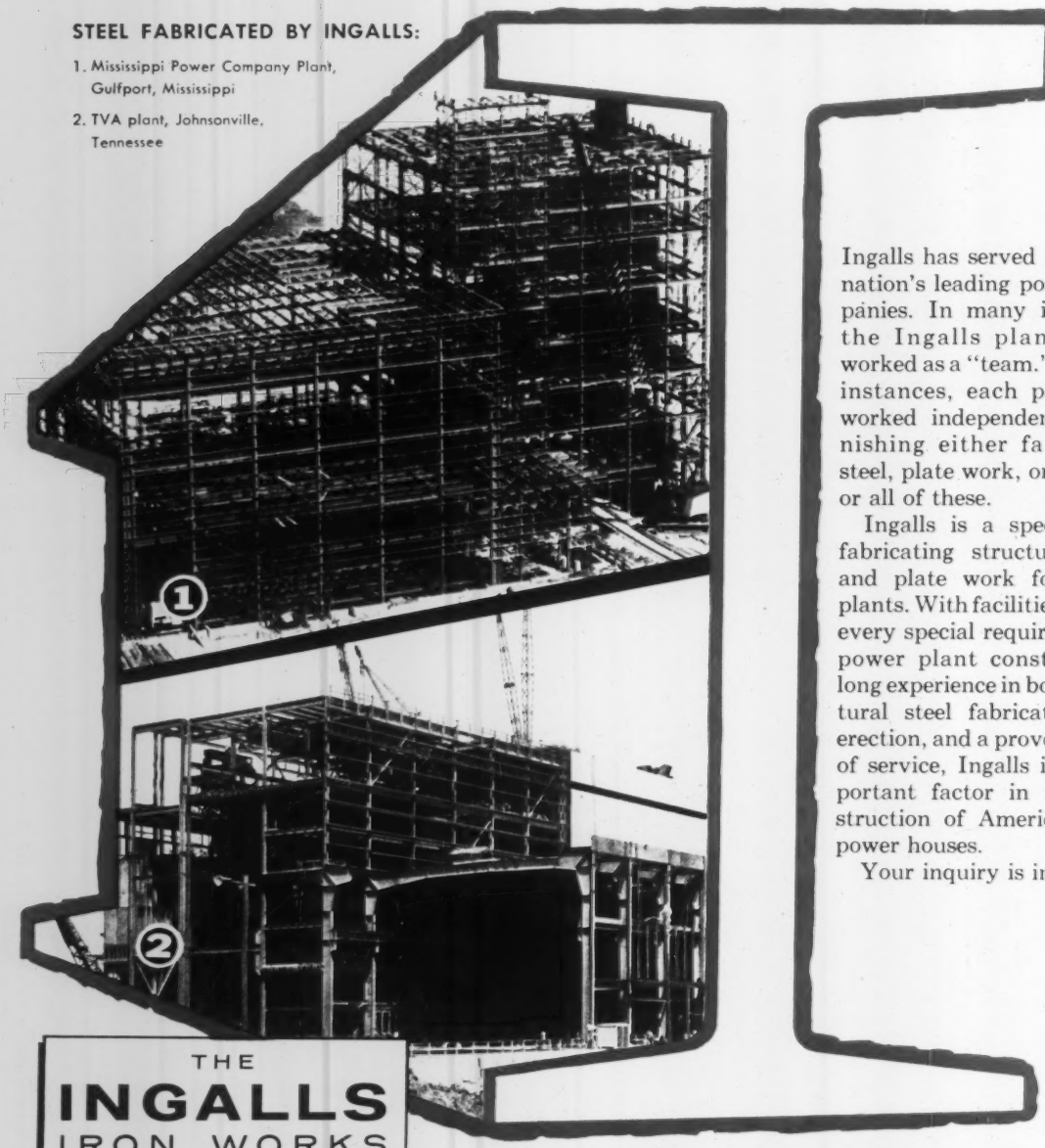
2. TVA plant, Johnsonville, Tennessee



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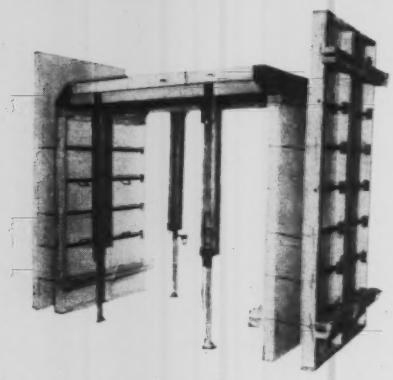
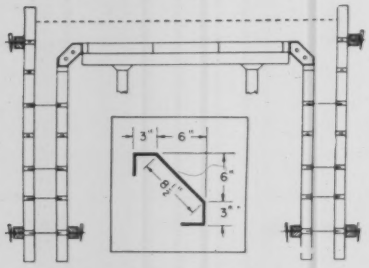


Symons Develops New Haunch Form for Culverts

Symons Safety Shores Used to Support Slab

Symons now has a new 9 x 9 inch steel haunch section designed to connect Symons standard wall panels and slab panels for the monolithic pouring of culverts. This new section provides for a 3-inch face on the roof slab and



on the wall with a 45-degree-angle surface 8½ inches wide between wall and roof. No built-up forms or other special equipment is necessary.

Made of 11-gauge hot rolled steel this new section is available in 4, 6, and 8 foot lengths. It can be used with either metal frame or wood frame forms. Symons regular form hardware is used for securing the steel section to Symons standard forms. No special fittings are required.

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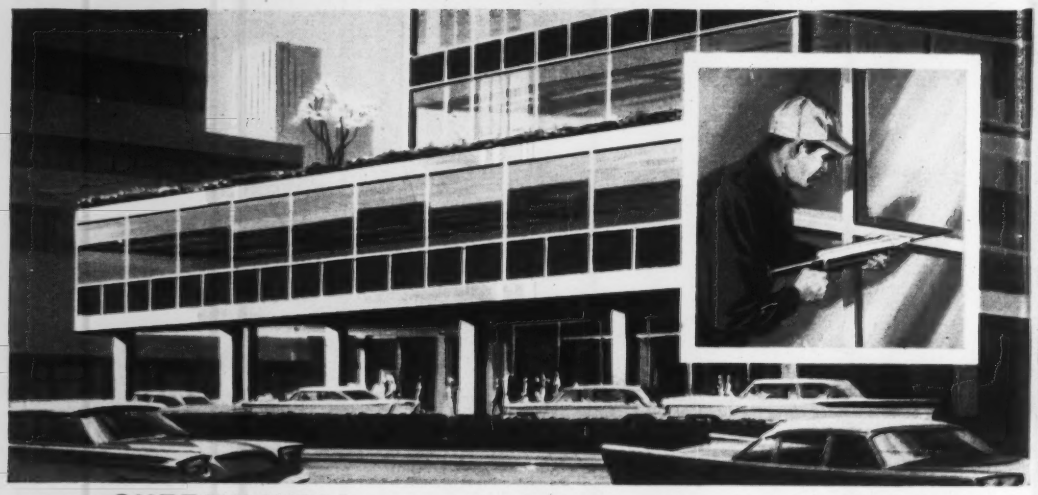

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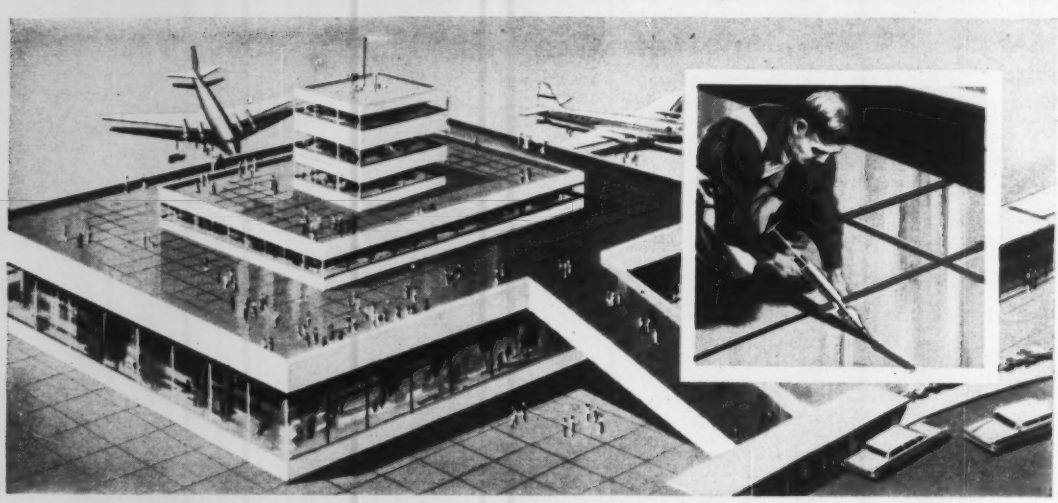

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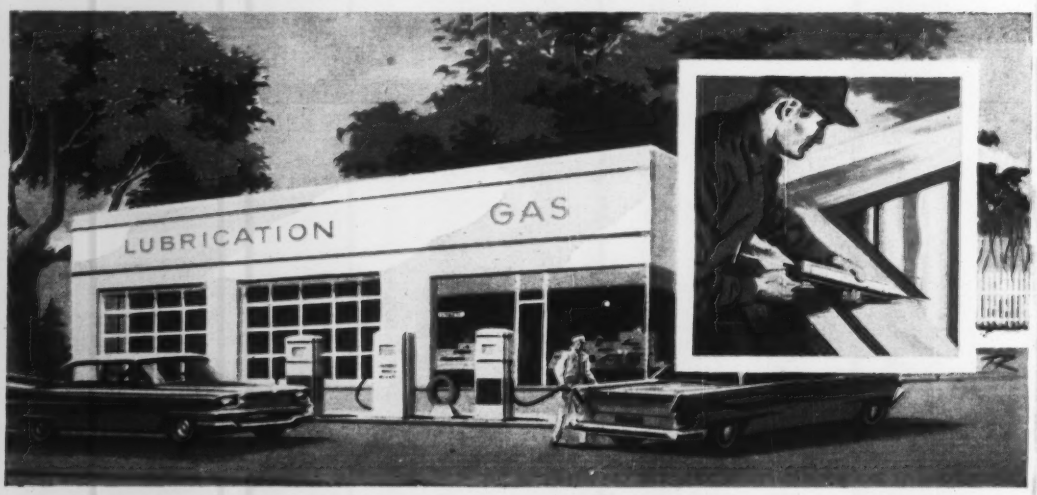

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Not only do they effectively adhere to glass, aluminum, porcelain, enamel, or any other building materials, but they also provide a seal for sure protection against buffeting winds. As a matter of fact, THIOKOL liquid polymer based sealants last so many years longer than conventional compounds, that they bring about reductions in the cost of curtain wall maintenance.

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Elastomeric sealants are also ideal for sealing joints in masonry and tile and other materials. They are extremely resistant to petroleum oils, solvents and gases. Their flexibility can be adjusted to meet specific applications.

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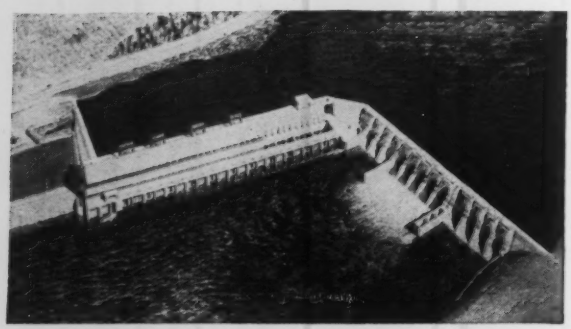
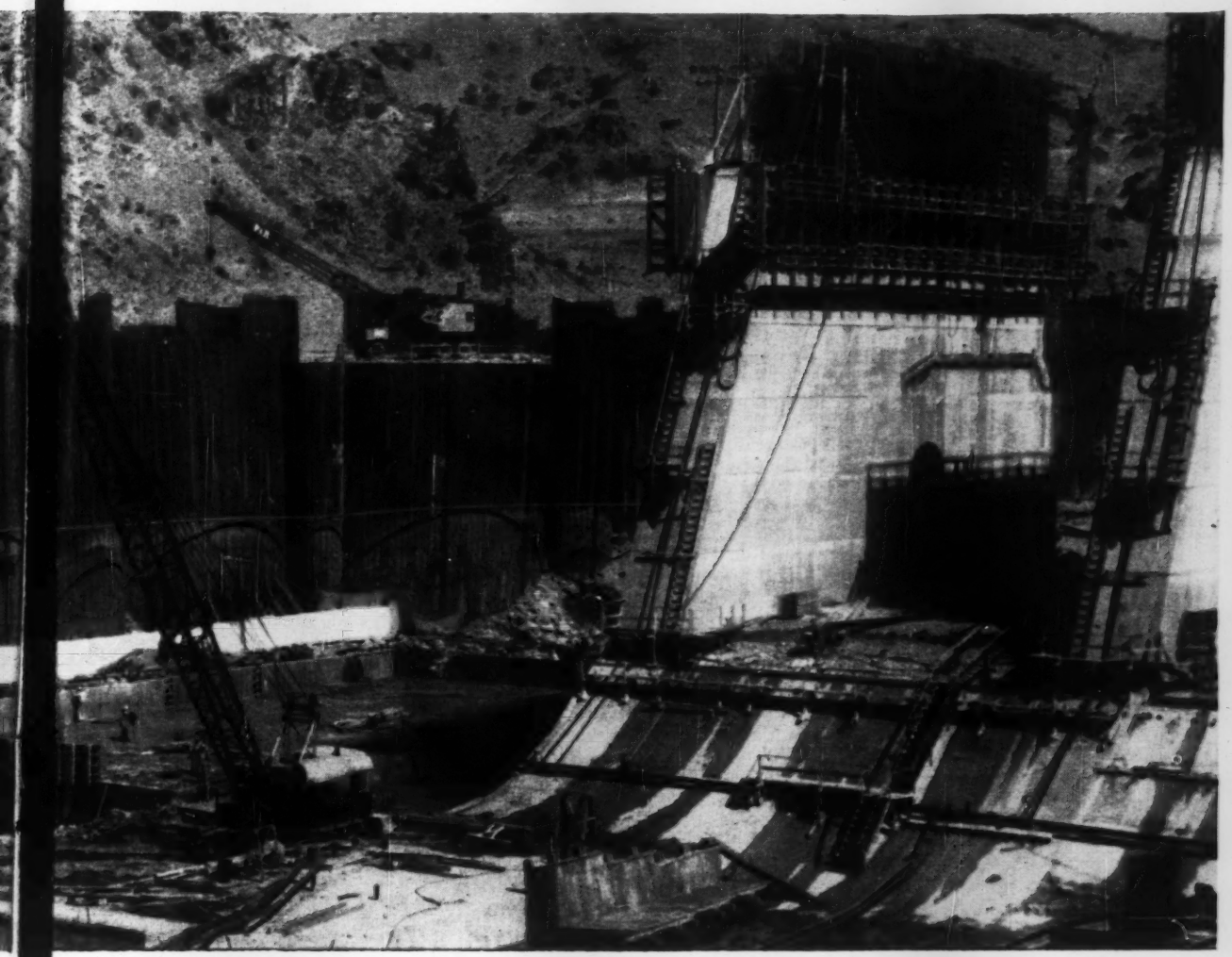


Rocky Reach Hydroelectric Project, Public Utility District No. 1, Chelan County, Wenatchee, Washington. Ultimate capacity: 1,200,000 kilowatts; Length of dam: approximately 5,000 feet, including 2,000 feet water-impervious earth cut-off; Height of spilling from bedrock: 127 feet; Normal pool area: 9,000 acres.

Designers and Engineers: Stone & Webster Engineering Corporation

General Contractors: Rocky Reach Dam Builders (a joint venture of four widely known firms). Pile Driving Sub-Contractor: Lebouef and Dougherty Construction Co., Richmond, California

USS MZ Piling of the type used for permanent cut-off walls to obtain high beam strength.



delivered on time for quick erection at Rocky Reach Dam, Washington

The new $273,100,000 Rocky Reach Hydroelectric Project near Wenatchee, Washington, needed steel sheet piling to start the project before the beginning of the annual flood stage of the Columbia River. Five thousand six hundred tons of steel sheet piling was made in Pittsburgh and delivered on time.

The USS Steel Sheet Piling was used to construct a portion of the 24-cell cofferdam, upstream and downstream cut-off walls and east abutment dam. The cofferdam was built in 103 days, or one cell every 4 working days. For this, USS MP-101 straight-web piling, driven to solid rock for maximum strength in tension, was used. Lebouef and Dougherty Construction Co., pile driving sub-contractor, states that the sheet pile interlock sizing was excellent and the piling placed without difficulty.

The cut-off walls were built with USS MZ Piling for maximum beam strength. These were also driven to solid rock for a permanent installation.

This is another case that illustrates the excellent cooperation on deliveries made possible by U. S. Steel's large production facilities and attention to customers' needs. When you want any type of piling—steel sheet or H-beam bearing piling—get in touch with the United States Steel office near you.

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Reader Comment

Prevailing Wage Criticism

SIR—In the article, "Prevailing Wages for Federal Highways" (ENR Jan. 23, 1958, p. 114), in which you report on the administration of the prevailing wage provision of the Federal-Aid Highway Act of 1956, the Labor Department boasts of the "infinitesimal number" of minimum wage determinations that have been challenged. Although this is surprising, it may be true. If it it true the only reason so few challenges have been made is due to the compulsory requirement that the Labor Department must consult with state highway departments.

In administering the Davis-Bacon Act as it applies to building construction and government owned facilities, the Labor Department acts in dictatorial manner and answers to no one—not even to the courts. On such determinations, the Labor Department may come up with another "infinitesimal number" of challenges, but what seems to be forgotten is that even 1% of 220,000 minimums is challenged there are 2,200 headaches for the construction industry.

When you speak of a challenge, you say a mouthful. It entails this: 1. An on the spot survey of the craft in question must be made. This means that a dozen or more general contractors or subcontractors must be contacted personally by a representative of industry and asked to sign a statement that he pays such and such a wage. This takes money for travel, three or four days of hotel expenses, long distance telephone calls and salary for the man who is assigned to do this useless job. The Davis-Bacon Act is useless because contractors naturally must pay prevailing wages to get craftsmen. They don't need a law.

2. Our apprentice training program or other important projects must suffer while one of our executives does the work of the U. S. Department of Labor. Nevertheless, we are forced to consider the opportunity to protest as a "privilege" because if we were not allowed to challenge some of these fantastic wage determinations the wage structure in our two states of North and South Carolina would skyrocket.

3. Even on the relatively rare occasions when the Labor Department does make correct determinations, the construction industry must spend money for on the spot surveys to make sure they are correct. The Labor Department often predetermines wages more than 100 percent higher than those actually prevailing. We must protest these immediately because we are certain the Labor Department is trying to pull something over the eyes of the taxpaying public.

What if industry failed to catch these mistakes? Our wage structure would be so far out of line with the rest of the economy that construction could not compete for the consumer's dollar. What if the industry could not afford to dispatch personnel to do the Labor Department's wage gathering work or check its work? The department would take its "available" rates (usually fictitious union rates), and make their predeterminations on that basis. There would be no challenges because certainly the unions would not protest.

We wonder if the small percentage of challenges is not due to the fact that the industry in many parts of our nation simply does not have the patience to gather the documentary evidence needed to fight errors.

Another thing. When you face the bureaucrats in the Department of Labor you've got to have the documentary evidence. In the Carolinas, we protest and the actual prevailing wage is determined because we have or can get sworn statements to back up our wage information. We realize that the Labor Department could take one of our contractors to court if he swore to a false statement, so we are ultra careful. The Labor Department's bungling bureaucrats could do anything, though, and you couldn't get them within ear shot of the judge—that's the law or the lack of judicial review in the Davis-Bacon Act.

The saving feature in the Federal-Aid Highway Act of 1956 is the requirement that the Department of Labor must consult with State Highway Departments. The situation would be much better if the Labor Department had to consult with some state authority before issuing predeterminations on building wage rates.

ROBERT PATTEN
Managing Director
Carolinas Branch, AGC
Charlotte, N. C.

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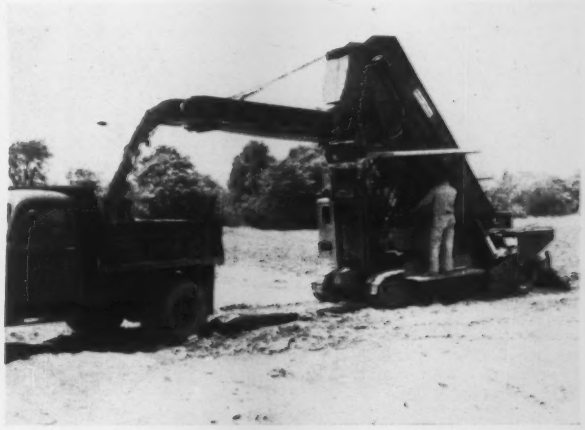

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KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)	
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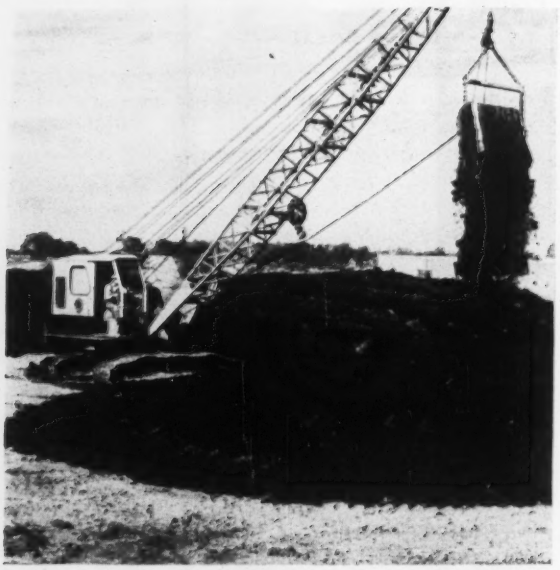
205 ON RUBBER	½-Yd.	30,000 lbs.	at 12-ft. radius
305 CRAWLER	¾-Yd.	30,000 lbs.	at 12-ft. radius
305 ON RUBBER	¾-Yd.	50,000 lbs.	at 10-ft. radius
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-ft. radius
445 ON RUBBER	(Crane only)	90,000 lbs.	at 15 ft. radius
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-ft. radius
805 CRAWLER	2-Yds.	104,200 lbs.	at 12-ft. radius
1205 CRAWLER	3-Yds.	190,000 lbs.	at 12-ft. radius

Want more information? *See Koehring distributor.*



Shopping center going in — Development of large-acre tracts for suburban shopping centers has created considerable new business for grading contractors. A typical job is shown here. The dragline is a Koehring 305, which has a capacity of ¾ to 1-yard — (for more details see chart).

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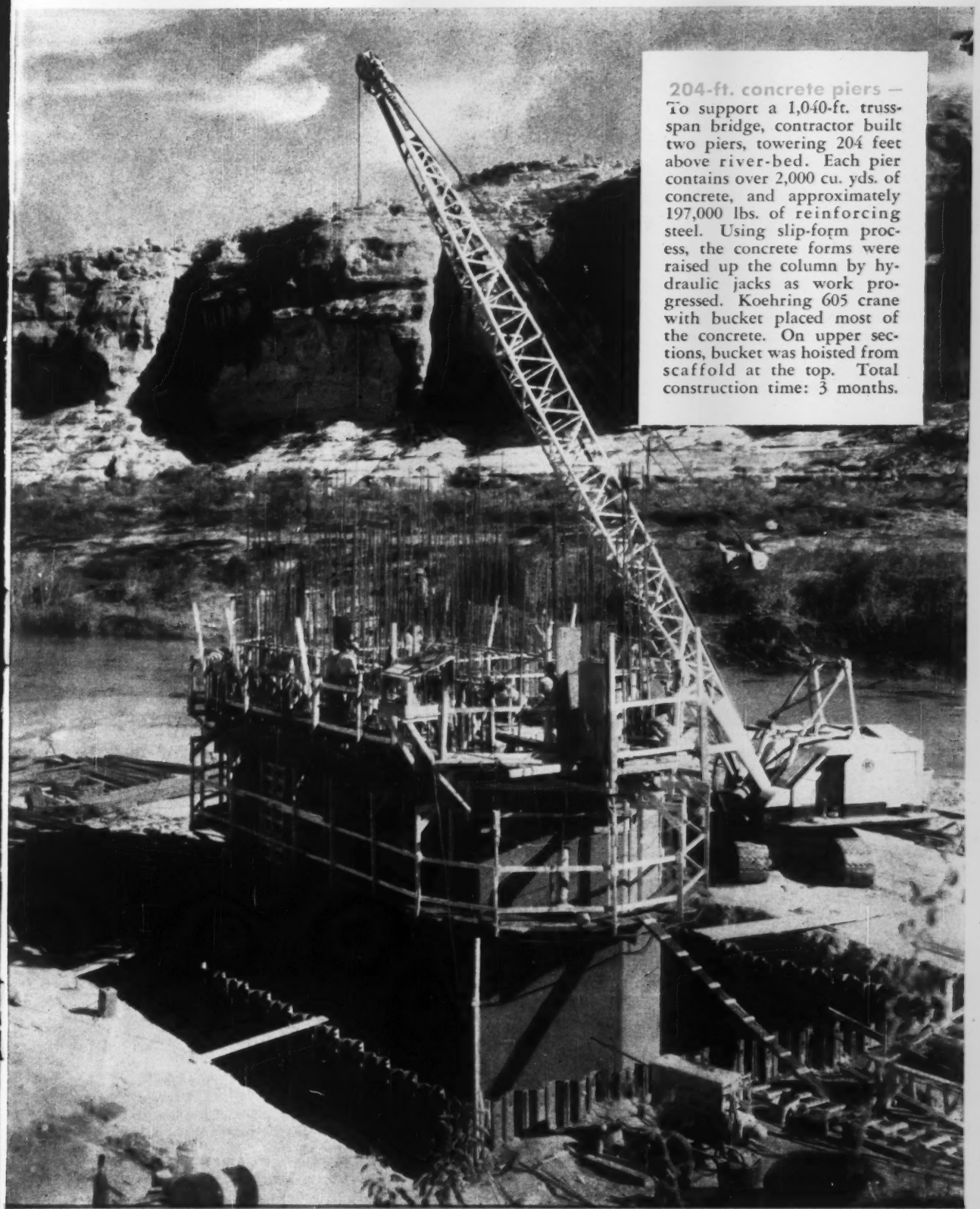
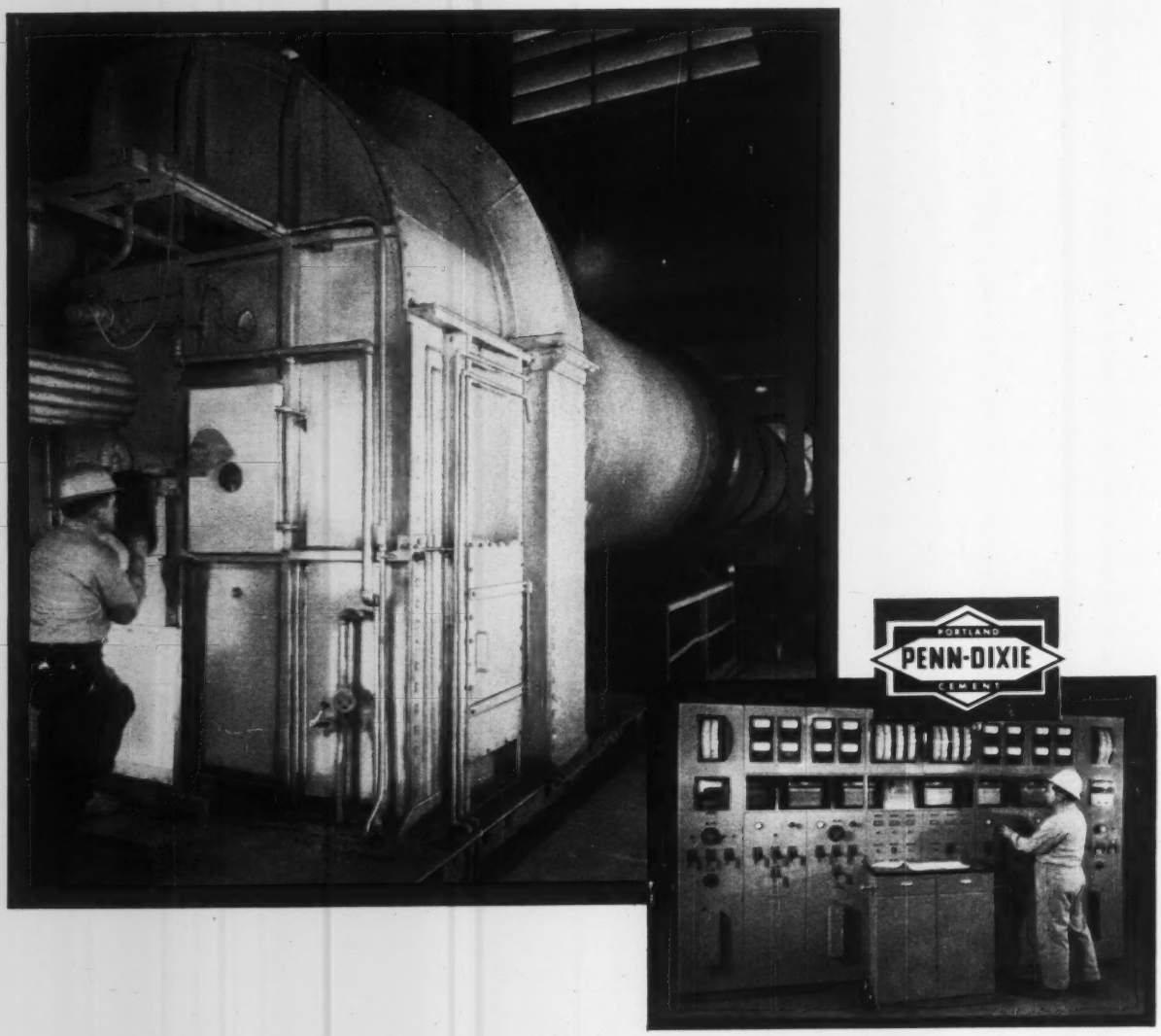


204-ft. concrete piers — To support a 1,040-ft. truss-span bridge, contractor built two piers, towering 204 feet above river-bed. Each pier contains over 2,000 cu. yds. of concrete, and approximately 197,000 lbs. of reinforcing steel. Using slip-form process, the concrete forms were raised up the column by hydraulic jacks as work progressed. Koehring 605 crane with bucket placed most of the concrete. On upper sections, bucket was hoisted from scaffold at the top. Total construction time: 3 months.

KOEHRING DIVISION OF KOEHRING COMPANY, Milwaukee 16, Wis.



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THE CONSTRUCTION WEEK

CAPITOL FIGHT CONTINUES—Opponents of the proposal to move the east front of the U.S. Capitol forward 32.5 ft and rebuild it with marble to preserve the detail lost another round last week. A parliamentary maneuver to block the reconstruction was defeated in the Senate. More battles are still ahead, particularly over Senate bill S. 2883, aimed at preventing the shifting of the east front.

MORE ON A-BOMB AS EXCAVATOR—Augmenting ENR's exclusive March 6 story (p. 31) on the probable use of nuclear explosions as construction tools, it was revealed last week that the Atomic Energy Commission and the U.S. Geological Survey are working together on plans to use nuclear explosives to create water-retaining land masses in arid regions. Where dense rock or other impermeable strata now promote rapid runoff or evaporation of precipitation, nuclear bombs might be exploded underground to loosen up huge masses and make them porous enough to store large quantities of water.

EVEN MIGHTY MISSISSIPPI HAS LIMIT—Last week the St. Louis area, largest metropolis in the nation that has done virtually nothing about discharging raw sewage, finally began planning a huge interceptor and treatment system. The action was directed at a U.S. Public Health Service interstate enforcement hearing in St. Louis early this month when the Mississippi River's reputation of being unpollutable by virtue of its tremendous flows was shattered for good. Pollution of Big Muddy has progressed to the extent that water samples of 125 miles downriver of the Missouri's confluence at St. Louis contain over 5,000 coliform bacteria per milliliter, the recommended PHS limit for drinking water supply. Over 200 raw waste outfalls in the St. Louis area deliver organic pollution load equivalent to that from 5.25 million persons (discharged by 1.2 million persons and numerous industries).

POLLUTION CONTROL DATA AT LAST—The totals have been compiled by population size group, state and river basin, and on the use of every step in all sewage treatment processes. Figures are given for both number of plants and population served, the data being 1957 information from about 12,000 communities. A complete set of electronic data processing equipment made the compilation possible in so short a time. The data are expected to be available for public distribution in about three months.

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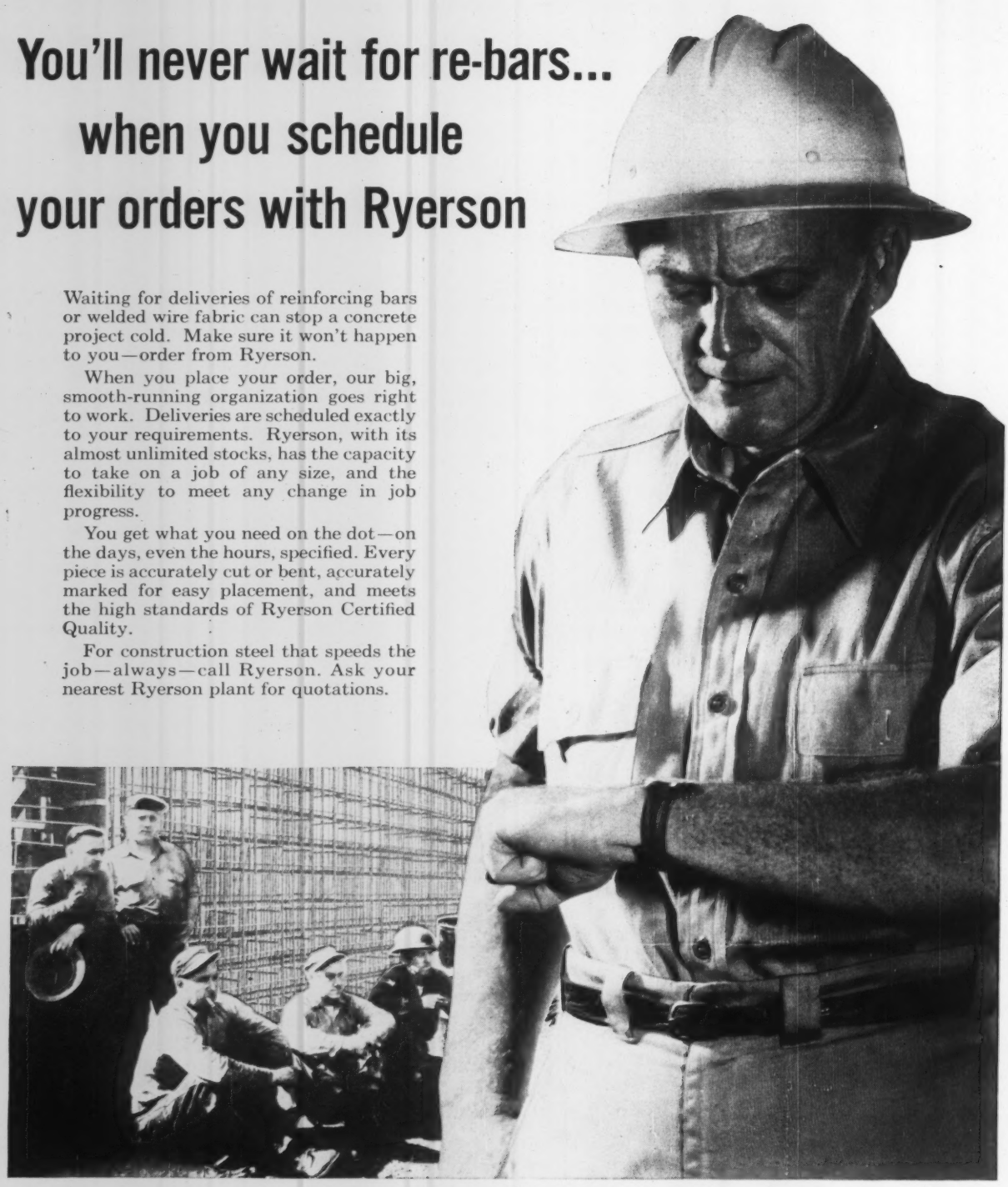

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WASHINGTON OBSERVER

- Commerce loses battle for statistics job
- FHA gets money to hire more field workers
- News stories distort defense contracting
- Lease-purchase building program zinging along

● **Commerce lost its fight to take over Labor Department's share of the government construction statistics.** Three months ago, the Budget Bureau ruled that the Bureau of Labor Statistics staff—working on housing starts, public works, and the like—should be consolidated in the Commerce Department's Office of Construction Statistics headed by Walter Schneider. At the time, this was considered a final victory in the long fight between Secretary Weeks and Secretary Mitchell.

Secretary Mitchell had enough power at the White House to force the Budget Bureau to turn around. Now the prospect seems clear that the two agencies—whether they like it or not—are going to have to continue to work in harness. Commerce officials are bitter, but there's little hope now that the attempt to bring all figures under a single roof will be made again while President Eisenhower is in office.

—

● **FHA is getting $2 million additional to hire staffs around the country to reduce the time it takes to approve mortgage applications.** The agency has been described as the bottleneck which could prevent an upturn in housing, despite easier mortgage money, additional mortgage insurance and lower down payments—all designed to increase starts.

The goal is to reduce present processing time of nearly a month to something closer to two weeks. The money will pay for more trained credit analysts, appraisers and inspectors. FHA offices should be able to start hiring any day now.

—

● **Don't count on $2 billion worth of Defense Department construction awards between now and June 30** as implied in recent Defense Department news stories. This is the contract total that was originally scheduled during the entire fiscal year ending June 30.

Newspaper accounts have implied that the military would award such huge sums during the months ahead. Actually, the military services are having their troubles getting their original schedules for contract awards.

—

● **The huge lease-purchase program for constructing government buildings is going ahead much faster than officials had dared hope.** Investors are bidding for projects at lower interest rates, and contractors are coming in with construction bids that are well within the cost estimates fixed by General Services Administration.

Out of a batch of 13 investment bids accepted recently, the interest ranged from 4.38% to 4.49%—well under the high of 5% which GSA accepted on one bid three months ago.

There's plenty of competition among contractors for awards. On a big public health center in Atlanta, Ga., there were 10 bidders. The award went to Henry C. Beck and Utah Construction Co. for $8.8 million; GSA's 1957 cost estimate was $10.5 million.

PRESTRESSING Adds New Values to Modern Warehousing

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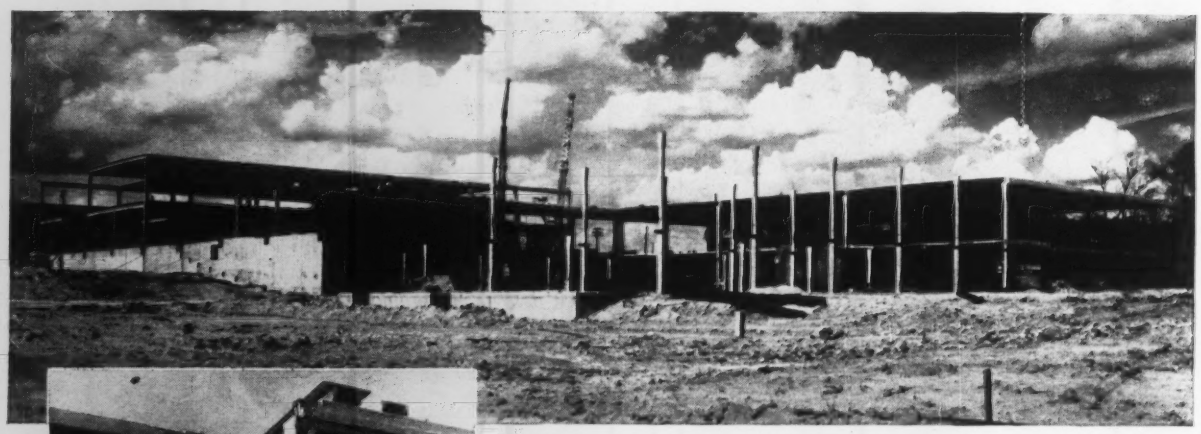

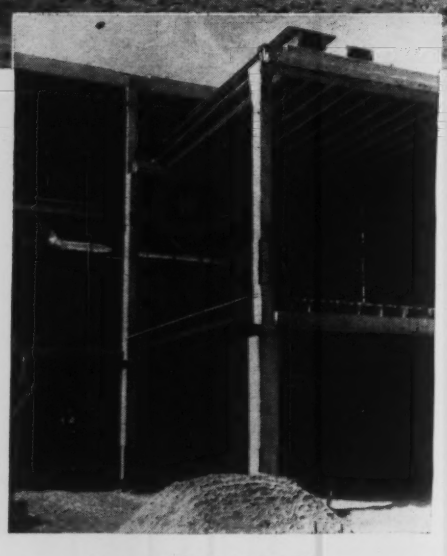

● Prestressed concrete is part of the answer to a designer's dream! Utilizing its amazing flexibility, he can plan vast areas of unobstructed floor space, combining the functional with the economical.

An impressive example is the new, modern fire-proof warehouse owned by the Allison Erwin Company in Charlotte, North Carolina.

Centered in the heart of the growing wholesale distribution industry in the Carolinas, the building contains a total area of 170,000 square feet. In it are stored thousands of household products—hardware, floor coverings, major appliances.

The framework—floors, girders and columns—is entirely of prestressed, precast concrete tied together with high strength concrete. All prestressed members were made with 'INCOR.'

Girders weigh three tons each; floor members up to four tons each. Columns were precast in one piece from footings to roof. All were trucked and erected in thirty days.

Here is another example of 'INCOR'* at work in the field of prestressed concrete. It makes possible new economies, new structural strengths, and new speed of erection that challenge any other construction method.

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Construction Debated as Recession Cure

Anti-recession plans are popping all over Washington—with both public works spending and tax cuts being promoted as necessary if the business slide is to be ended.

Within the last few days there's been a switch to tax cuts. Congressmen of both parties are preparing their own special tax cut packages while the Administration promises specifically that it has plans in the works to be presented to Congress for action "if needed."

There's no reluctance, however, in pushing more public works spending. Both the Administration and Congress are pushing hardest on anti-recession public works spending—the launching of new programs and increasing the spending on programs already under way.

I. Public Works

The latest entry is Interior Secretary Seaton's list of new reclamation projects for which additional funds are being asked. Interior will ask for $70.8 million more for reclamation, boosting the fiscal 1959 appropriation request to $232.6 million.

Of the new money asked, $45.8 million will be for expediting construction already under way. Projects on Secretary Seaton's list for new money are: Trinity River diversion project in the Central Valley of California; Glen Canyon Dam on the Colorado River storage project in Arizona; prime construction projects to be let for Flaming Gorge Dam in Utah and Navajo Dam in New Mexico, and other structures of the Colorado River storage project.

• **Upping the ante**—President Eisenhower on March 8 expanded his list of speeded-up federal civil works programs. Removal of the Administration's earlier brakes on spending, plus recent orders from the White House to push work for which Congress has voted funds, will step up expenditures on civil works by $200 million in the next few months, the President indicated.

So far, for the year beginning July 1, President Eisenhower said he would send to Congress requests for $125 million for the Corps of Engineers, $15 million for Agriculture's watershed projects, in addition to the reclamation requests. Also, about $25 million is to be sought to start local small reclamation projects.

It is doubtful if these increases will satisfy Congress. Rep. Clarence Cannon, chairman of the House Appropriations Committee, already has sent back the original budget requests of the Army Engineers and Reclamation with directions to bring back "adequate" money programs for fiscal 1959.

Sen. Lyndon Johnson, Democratic leader, started resolutions through Congress calling for increases. This was largely an up-dating of a program for public works expansion that he has been shepherding through Senate committees during the past months, but it caught the Administration off-guard. Last week Senator Johnson got his resolution passed by the Senate—with the Republicans joining in. The resolution itself, however, only puts the Senate on record, as backing increased public works spending.

President Eisenhower put Republicans into the battle over public works spending programs with a letter to the GOP spokesmen in Congress—Sen. William F. Knowland and Rep. Joseph Martin. Ignoring the Democrats, the President told his Republican spokesmen that he hoped Congress would increase spending on some public works projects already under way. He also favors a $600 million increase in the rate of contract-letting for highways, effective this year and next. He did not put a dollar total on his proposals, but they came to something less than $1 billion increased spending this year.

As reported by the Senate public roads subcommittee last week the bill would give the states $400 million immediately for prompt use on federal-aid highways other than the interstate system. This money would be apportioned on a 70-30 federal-state matching basis—instead of 50-50 under present law. Actually, though, the proposal permits states to use this federal money to pay 90% of the cost of a project. The provision is that the federal government would later deduct from state allocations the 20% needed to bring the final cost allocation up to the 70-30 formula. The 20% would be deducted from the state's Bureau of Public Roads allocation for 1961.

Besides this the Gore bill would remove for three years beginning July 1 the present restriction on the highway trust fund which limits allocation for any one year to the anticipated tax revenues coming into the fund. Along with the change, the bill has provisions designed to increase actual allocations for the interstate network for the three years by nearly $3 billion. This means the states would get $7.2 billion of 90-10 money for the interstate network for the three years beginning July 1, instead of the $4.4 billion available under present trust fund limitations.

The bill approved by the committee would mean a total for all federal-aid highways in the next three years of $10.3 billion, an increase of more than $3 billion above the amount permissible under current trust fund restrictions. President Eisenhower's plan would increase total federal interstate highway

allocations by only $2.2 billion for the three fiscal years, 1959-61; this would bring the figure to $6.6 billion.

II. Taxes

The Administration seems to be moving faster toward tax cuts. Vice President Nixon and Labor Secretary James P. Mitchell both plunked for tax reduction if the unemployment rise is not halted in a short time. Mr. Nixon spoke of a decision in the next few weeks—with an eye on the March unemployment survey which will be released about this time next month.

Mr. Nixon's view that he "would go down the tax-cutting road rather than the spending road" if additional steps are required, is shared by top Administration officials. They view the current round of increased spending plans for public works mostly as a holding operation, to placate Congress until next month's round of economic statistics come in.

• **Where the cuts are planned**—The exact details of any tax cut proposal by the Administration are still being worked out, but its basic principles have been decided on. Here are the highlights:

• There would be cuts for individuals. One possibility includes a split in the first bracket rate in order to throw a substantial part of the reduction into the low-income bracket.

• There would be cuts proposed in excise rates. Lower excises on autos and household appliances are a prime goal of both Administration economists and Democrats in Congress.

• There likely would be a cut proposed that would apply to the corporation tax rate.

The argument here is that business feels the same pinch as individuals when incomes decline in a recession. The quickest way to help hard-hit businesses retain a normal work force and a normal flow of orders to manufacturers is to lower their tax liability. If this idea survives, the cut will be made so that the greatest benefit will fall on small business.

There's no decision on what the package should offer by way of total relief, but $5 billion to $7 billion is being discussed.

Railroads Look to Research

AREA meeting also stresses need for legislative relief for railroads in improving equipment and facilities

With engineering manpower problems becoming considerably less critical than at this time last year, railroad management is turning full attention to research as a means of reducing operating and maintenance-of-way costs, and improving passenger and freight service.

More than one speaker at the 57th annual meeting of the American Railway Engineering Association in Chicago last week either tackled this broad subject of railroad research head-on, or touched on various aspects of it.

• **Research**—Crystallizing the research problems facing many railroads today, Wm. M. Keller, vice president-research of the Association of American Railroads, told an attentive audience that research must develop rails, ties and roadway equipment that do not require so much maintenance expense. "If the railroads are to survive the regulatory inequities they now face, they have no choice but to look to increased research to reduce expenses," he said.

Mr. Keller called for more teamwork in research than ever before. "The electronics expert must work closely with the structural engineer; the stress analyst with the metallurgist; and the chemist with the physicist. The research team, aided by both practical and theoretical advice of AREA committees and individual members of the association is the answer to this problem," he said.

As an aid in these studies, said Mr. Keller, $160,000 worth of hydraulic pulsating equipment will be installed this year at the AAR research laboratory in Chicago. It will be used in research studies on ballast, tie-wear and structural spans.

Positive proof that railroad research will be expanded was given in the announcement by William T. Faricy, chairman of the board and chief executive officer of AAR, that a science laboratory will be added to the association's research center in Chicago next year or early in 1960. It will contain an electronics laboratory and provide housing for laboratories for metallurgical research, analysis of gases and exhaust, and development of new fuels and lubricants for locomotives and cars. It also will provide room for a nuclear reactor whenever the association needs it, he added.

Pointing out that the activities of the AAR research department are not confined to those conducted at the research center, Mr. Faricy called attention to the jointly sponsored research project being conducted at Northwestern University to develop new information in the complex members of bridge structures (ENR Jan 30, 1958, p. 53).

• **Current projects**—The extent to which the railroads are striving to improve their roadbed and equipment was outlined by Gerald M. Magee, director of engineering research, of AAR. These include improved methods of cleaning the roadbed to reduce cost of this work and to lengthen the life of tracks; improve quality of rails and ties, and the control of vegetation on roadbeds.

Two new and interesting phases of roadbed stabilization experiments, Mr. Magee said, are: The use of lignum liquor injections in the roadbed to prevent frost heaves in the winter months in northern areas; and asphalt spray on sand which has been specially sloped on the roadway to prevent drifting during heavy winds in extreme western areas.

• **Prestressed ties**—Experiments in prestressed concrete ties during the past year were conducted on 36 ties, installed in track for observation of service performance, said Mr. Magee. The prestressed ties incorporated three different designs, using both standard and lightweight concrete.

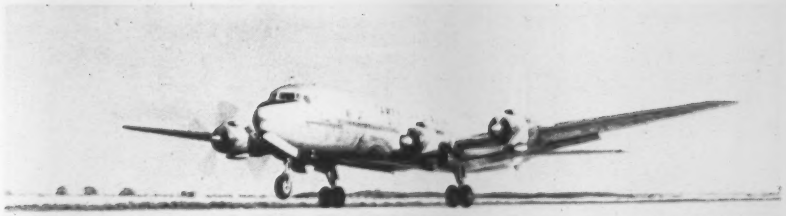
Other current research of interest to railroad engineers include laying of rail tight with frozen joints, rather than using welded rail, and experiments with waterproofing concrete.

• **Deferred maintenance**—A challenging approach to the problem of reducing maintenance costs was posed by G. B. Aydelott, president, Denver & Rio Grande Western Railroad. He pointed out that with careful study considerable maintenance can be deferred without undue harm, provided it is based on a realistic program on how to extend the life of track and structures.

• **New officers**—Registration exceeded 2,100 at the three-day conference. At the annual luncheon B. R. Meyers, chief engineer, Chicago & Northwestern Railway System, was elected president of the association, succeeding Ray McBrain, director of research, Denver & Rio Grande Western Railroad. F. R. Woolford, chief engineer, Western Pacific Railroad, moved up from second vice president to first vice president; while E. J. Brown, chief engineer, Burlington Lines, was elected second vice president. Neal D. Howard is executive secretary of the association.

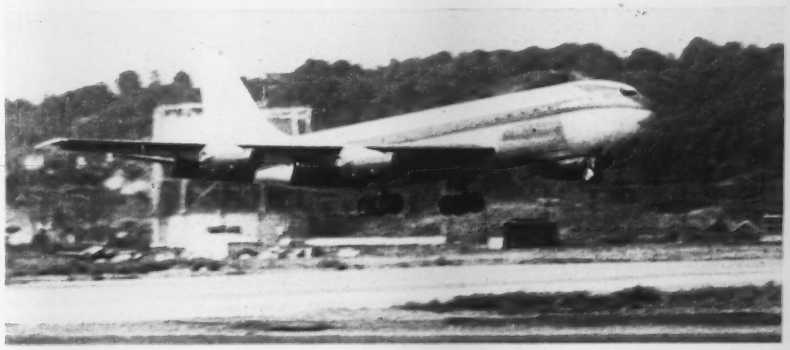
The 37th annual exhibition of the National Railway Appliances was held at the same time in Chicago's Coliseum.

Today's . . .



PROP-DRIVEN AIRPLANES need long runways for takeoffs and landings.

Tomorrow's



GIANT JET AIRLINERS will need even longer runways and improved terminals to make them pay off.

Today's Airports Are a Jet-Age Bottleneck

Officials of the Cabinet-level Airways Modernization Board disclosed to ENR last week that the U.S. will need 70 airports capable of handling jet airliners by the end of 1960. At least 40 of these will be full-fledged jet terminals; the remaining 30 will provide alternate landing facilities.

When the first commercial jets, the Boeing 707 or the Douglas DC-8, are handed over to the first airline will our airports be ready for them? Will runways be long enough, and will terminal facilities be adequate to service these giant planes? These are some of the questions being asked today by both airlines and airport operators as they plan ahead for the needs of 1960. Airport designers, government officials, airport operators and transportation consultants agree that the advent of the jet poses a very special problem for most airports.

But the methods for solving this problem are controversial.

Some authorities complain that while a tremendous amount of research is being done in the field of airport modernization, little of it is coordinated. Still others feel that altogether too much research is being done and that most engineering answers will evolve as experience with existing designs grows.

• **So many unknowns**—The consensus is that, in view of the lack of experience with jet air transports, design criteria are really unknown; the question is what to design for in the face of rapidly changing technology and increasing airport traffic.

The Civil Aeronautics Administration's Office of Airports is equipped to help engineering firms plan new airport developments, but its experts appear to be as much in the dark about jet age airports as do consulting engineers—and for the same reasons. They simply do not have a background of experience on which to rely—excepting that provided by military jet airports, which are airfields of a different species.

One of the most recent government agencies in the field of airport research and development is the Airways Modernization Board, established late in 1957. The board consists of Lt. Gen. Elwood R. Quesada, USAF (Ret.), Secretary of Defense McElroy and Secretary of Commerce Weeks. These three men are responsible for setting research and development goals in the fields of communication, navigational aids and traffic control. In addition, they are responsible for selecting and standardizing airways facilities.

According to officials of the AMB, aeronautical information on the new jet aircraft has been most difficult to get. It was not until last year that this information began to filter in.

While the airlines themselves based their orders for jet planes on analysis of existing airports, there is little doubt that these will have to be expanded to accommodate the new planes safely and efficiently. In short, the problems of heavy air traffic, new approach lanes, extended runways, traffic control and new holding patterns will continue to grow. Officials of the AMB emphasize the great need for continued study in airport design if we are to meet the jet-age challenge.

• **Runways and taxiways**—When the airlines decided to buy jet planes for future use, preliminary inspection of existing runways, taxiways and ramp areas led them to conclude that in nearly all cases, existing airports would require some alteration, but the basic designs were good enough to be adapted to jet operations. In fact, structurally, most existing runway pavements will handle the jet planes. (The wheel loadings of the jets being essentially the same as for the current prop-driven planes.)

Knowing that they must be realistic, the airline operators did not ask airport authorities for maximum runway lengths. They realized they could not afford to pay for such runways, especially when the added length might be needed only once or twice a year (on the hottest days against maximum winds). Instead, airlines are settling for realistic lengths to which they occasionally will have to fly with reduced payloads. They want runways that will give adequate service without extravagance.

In general, for maximum payloads,

. . . Today's airports are a jet-age bottleneck

TRAFFIC CONTROL facilities of most existing airports are inadequate. Modernization now, before the real pinch arrives, is the remedy.

runway lengths of from 8,000 to 15,000 ft will be needed. So, at most major airports, runways will have to be lengthened somewhat if the new jets are to be accommodated efficiently. Fortunately, most existing runways have widths of at least 150 ft—adequate for jetliner operations.

To decrease the possibility of engine damage by stones and dirt that might be sucked into the engine if it were overhanging an unsurfaced area, most taxiways must be widened from the existing 75 ft standard. Shoulders will have to be added to bring the taxiways up to at least a 125 ft total width. And for the same reasons, fillets may be needed on many airfields to increase the radius of taxiway intersections with runways.

• **Runway orientation and noise**—Jet transports will complicate runway orientation problems too, since most runways have been laid out for operation into the prevailing winds. While having headwind at takeoff and landing is important to a jet, the noise problem also must be considered. And unfortunately, some of our major runways were built unmindful of this problem.

While successful noise suppressors have been developed, they introduce a thrust loss at take-off and an increase in drag during flight. Use of the suppressors requires an additional 240 ft of runways to compensate for thrust loss, and the added drag exacts a penalty of about 2% in fuel consumption for a given cruising speed. Result: Increased operating costs of some $6.50 per hour with a payload penalty of about 1,600 lb.

So, for the jet airplane, orientation of the primary runway must be a compromise between requirements of the traffic pattern, prevailing winds and the noise effect on the community. Yet even with a compromise, proper runway orientation is difficult, to achieve.

For example, Denver presents an interesting problem. The only existing runway that jet transports can use runs east-west. Prevailing winds prevent eastbound takeoffs much of the time because of tailwind components, while on westbound takeoffs, a jet transport would be over downtown Denver before it could turn on course. Providing a suitable north-south runway would be the proper solution from an operational and noise abatement view—yet to do so would be physically most difficult.

Further complicating the runway orientation question are the flight characteristics of swept-wing airplanes; a jet is more difficult to control during take-off and landing in a crosswind. Yet many of our airports do not have secondary runways that are long enough to accommodate the jet should the plane have to avoid crosswinds. Construction of such crosswind landing strips or addition of length to existing ones will be one of the major problems in the modernization of airfields for jet flights.

Airports, such as LaGuardia, at New York, and Washington National, which were designed in the 1930s, era of the DC-3, cannot be expanded further. In such cases the only answer is to build new airports, probably at greater distances from the cities to get cheaper land and to avoid conflicting air traffic patterns.

In considering the location of new airports a whole string of new problems besets the planners, involved are: consideration of conflicting traffic and holding patterns; assessment of land values; selection of the site for good drainage; building of access roads, and installing utilities.

• **Terminal facilities**—In general, the facilities of today's airports also are inadequate to service and maintain jet planes. Extra quantities of fuel, demineralized water, electricity and compressed air are needed. A refueling delivery capacity of some 1,200 gpm is deemed necessary if the jets are to be serviced rapidly. This means a whole new concept of fueling operations: larger trucks or underground fuel storage, new hydraulic pumping and shut-off systems with more refined measuring devices. Added to this is the fire hazard of the larger amounts of fuel handled. While the fuel (kerosene) is less volatile than aviation gasoline, it has a wider range of inflammability to increase its danger. And spillage means troubles with pavements in parking areas.

Couple the plane maintenance problem with that of passenger, baggage and food movement—passenger loads of up to 200 per flight will be common—and one begins to understand the complexity of the situation. A passenger who has made a 4½ hour flight across country is in no mood to be slowed down waiting in long lines at ticket counters and baggage windows.

Another problem comes in docking the jet. The heat and blast effect of the jet engines are formidable, so that some way of protecting passengers from these must be devised.

• **Future developments**—Probably the paramount question in the minds of airport planners today is this: "How can we avoid building long, expensive runways?" Researchers are trying to find some answers.

Runway turnoffs may be one way to cope with the problem. While maximum possible turnoff speeds have yet to be determined, present thinking indicates that speeds of from 45 to 65 mph ought to be the basis of design, with radii of curvature around 750 to 1,000 ft.

Another way of cutting down runway length is being considered by the AMB—catapaulting and arresting the jet at the runways.

The final area of study is design of the jet aircraft itself. High angle or vertical take-off aircraft would answer the long runway problem with certainty. But such designs are probably still only dreams for the future.

A-Power Review

Congress and AEC hammer out development pace

The annual Congressional inquiry on how well the youthful atomic energy industry is doing has produced a picture like this:

• Everyone agrees that there is no purely economic justification for a crash program of developing atomic power in this country. The U.S., with its great reserves of low-cost fossil fuels, produces conventional power so cheaply that atomic reactors will have a tough time competing for years to come.

• Despite this, spokesmen for reactor manufacturers and even private power companies agree with committee Democrats that the AEC must accelerate its program if the U.S. is to maintain world leadership in atomic technology. Energy-short nations need atomic power now.

The sharpest clash of opinion comes between committee Democrats on the one hand, and the Atomic Energy Commission and the private power companies on the other, over whether AEC's "partnership" policy with private industry will get the necessary job done.

Leading Democrats claim that, with profits nowhere in site, private industry cannot and will not make the huge investments necessary for early development of competitive nuclear power. They have introduced legislation under which the government would build large-scale federal reactors at AEC sites.

The AEC, which has limited its activities largely to construction of small experimental reactors and research and development aid to private companies on larger ones, strongly opposes the Democrats' stepped up program, as do the private electric utilities.

It is now clear that the Democratic Congress will move, with or without AEC's blessing, to accelerate the power reactor development program, with emphasis on developing a foreign market for U.S. reactors. The unanswered question is how. The Joint Committee showed the most interest in a proposal by Chauncey Starr of North American Aviation's Atomics International Division.

Specifically, he proposes that foreign customers be allowed to purchase atomic power plants from U.S. firms at about the same price they would pay for construction of a conventional plant of the same output. The U.S. Government would pay the U.S. manufacturer the differential between his price to the purchaser and the actual, higher cost. Mr. Starr assumes that U.S. firms would subcontract conventional portions of reactor construction to companies in the nation involved.

A certain amount of agreement is reported to have been reached in closed-door talks between top AEC officials and key members of the Joint Committee. It appears there may be agreement that:

• AEC will double its reactor development program with the goal of achieving economic nuclear power within five years abroad, and within 10 years in this country.

• AEC will build three experimental reactors at AEC sites—including the gas-cooled, dual-purpose and natural uranium-consuming types.

• A greatly stepped-up program of federal research to develop more efficient fuel elements is desirable.

However, AEC is resisting pressure from Joint Committee Democrats to adopt some version of the Starr proposal for accelerating development. The commission favors loans to foreign countries, in place of capital subsidies, and prefers to limit domestic subsidies to research and development help, plus a break on cost of fuel elements.

The final result of the AEC-Joint Committee negotiations will become apparent after the Easter recess, when commission officials are expected to testify on their authorization bill for the next fiscal year.

Maryland Is 30% Behind On 12 Year Road Program

Maryland finds itself lagging by 30% in the first four years of its 12 year highway building program, reports the state's roads commission. The commission has built or started only 888.5 miles of 1,262 miles scheduled for the four year period.

Also in those four years, while 70% of the planned mileage has been reached, 80% of the funds allocated for that period have been spent or obligated. About $276 million have been obligated against original estimates of $250 million. The state has, however, earned federal credits of $46 million against that outlay.

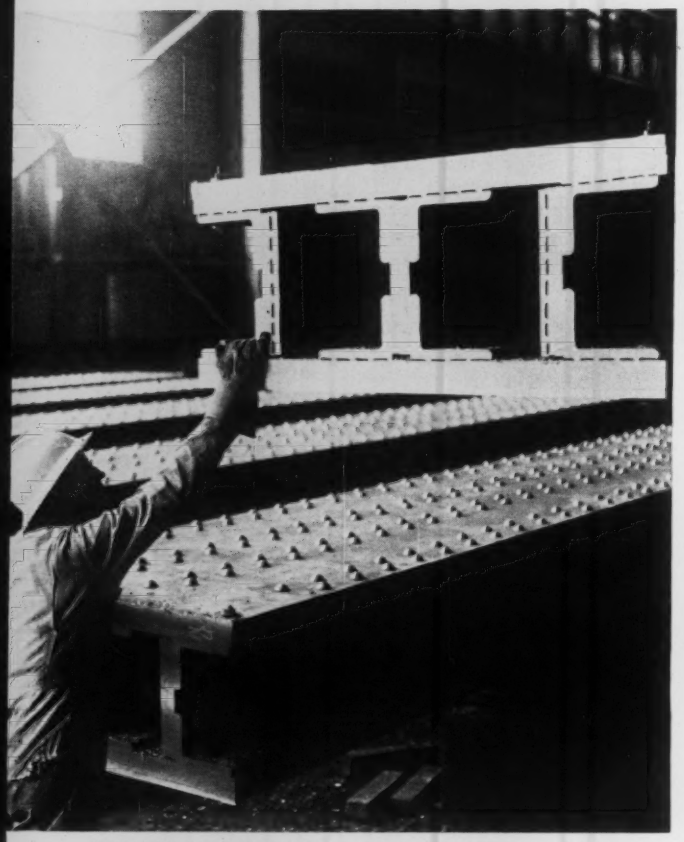
The original 12 year plan included 3,302 miles of primary and secondary roads and 145 miles of interstate highway. To this has been added another 183 miles of interstate highways. Projected on a 15 year basis to coincide with the federal highway program, total cost of the state's road programs will come to over $1.1 billion, estimates Robert O. Bonnell, chairman of the roads commission. And when estimated state and federal revenues are subtracted, the commission will be $66 million short.

Cofferdam Collapse Kills 11

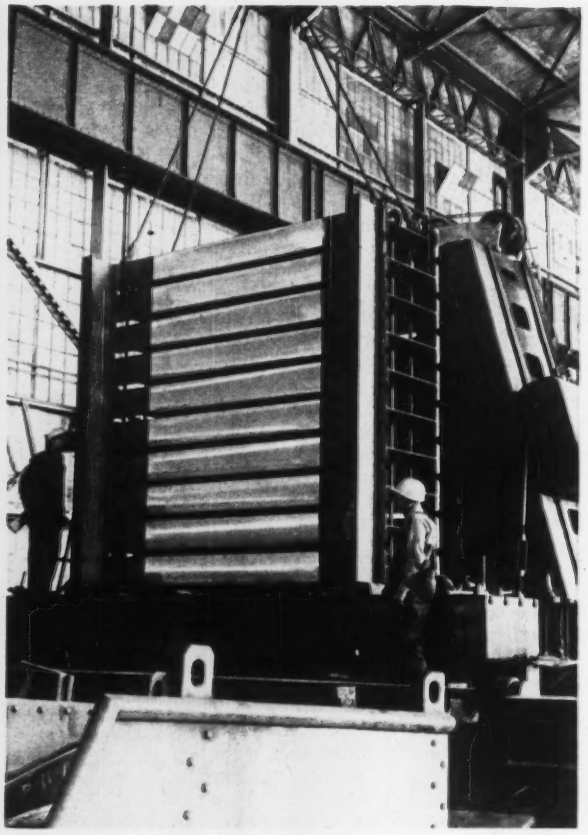
Eleven men were trapped and killed in Canada when the cofferdam for a bridge pier buckled under the pressure of an ice crush on the night of March 5. Three other men working in the cofferdam escaped. The bridge, on the route of the new Laurentian Highway, spans the Rivieres des Prairies about 10 miles from downtown Montreal.

The cofferdam—made of interlocking steel sheetpile and reinforced with steel beam struts and walers—is set in about 30 ft of water. The men were working about 10 ft below the river bottom when they were caught by a wave of ice, water and debris. Mild weather had loosened the ice on the frozen river and an unexpected buildup of ice against the cofferdam is believed to have caused the steel beams to buckle. Frogmen have been diving for the trapped bodies.

The bridge is being built by Dufresne Construction Ltd., Montreal. An investigation of the accident is to be made by the Quebec provincial police, the Quebec Labor Bureau and the construction company.



TRIPLE-WEB COLUMNS are being fabricated for the 60 story Chase-Manhattan Bank building in New York City.



GRILLAGE for a bottom column, which can carry over 7,000 tons, is 12 x 14 ft by 36 in. thick.

52 Ton Columns Readied for Skyscraper

Steel columns for the Chase-Manhattan Bank building, now in the foundation stage in New York City, are so large and heavy that special fabricating devices had to be developed for shop handing. The compression members account for about 50% of the 50,000 tons of structural steel required for the 60 story office building.

Bethlehem Steel Co. is fabricating the frame at its Pottstown, Pa., works.

Bottom columns of the skyscraper have a maximum length of 36 ft and weigh as much as 52 tons. They were designed to support loads of more than 7,000 tons. Accordingly, they have flanges up to 52 in. wide and 6½ in. thick, made up of plates with a maximum thickness of 1 in. And they have three webs, the center one consisting of plates attached to the flanges with four angles and the outer ones of plates with two angles.

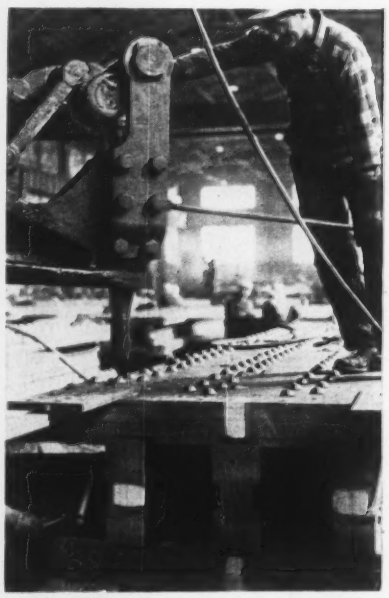
For making wind connections to the girders, the inner flange plate on each flange extends about 3 ft beyond the edge of the other flange plates. The girders are used in pairs. Either channel or I-shaped in cross section, these flexural members are riveted plate girders. At the columns, the web of a girder butts into the extended flange plate and the girder flange angles are riveted to the gusset. Field holes for these plates are drilled with the aid of metal-bushed templets, to assure matching of holes.

An average of 550 rivets are required for each column.

The grillages for bottom columns are 12x14 ft in plan and composed of 36 WF 150 beams. An area 6x11 ft atop each grillage is milled in the shop to receive the 19 in. thick, 12.5 ton forged billet on which the column bears.

The fabricator says months were spent devising the best procedures for moving these unusually heavy members through the shops. Rolling stands for fitting and riveting had to be designed, as well as hubs that make it possible to turn the members to any position with the aid of small floor cranes.

Skidmore, Owings & Merrill are the architects. Turner Construction Co. is the general contractor. Weiskopf & Pickworth are the structural engineers.



MACHINE rivets flange plates, which total 6 in. in thickness.

Bucyrus-Erie 71-B Marks Trend On Biggest Idaho Road Job

The use of a Bucyrus-Erie 71-B shovel indicates a new trend toward bigger equipment in northwestern highway work. This rugged machine was chosen by the prime contractors, F. H. Slate Co. and E. C. Hall Co. of Portland, Ore., to load out rock, topsoil, and gravel in mountainous terrain 10 miles east of Coeur d'Alene, Idaho.

The project is the biggest roadbuilding job ever let by the Idaho Department of highways. Running through Fourth of July Canyon, this 7.2-mile segment of the Interstate System replaces a narrow, winding road long cursed by irate drivers. It's the first four-lane divided highway ever attempted in such mountainous country. Some 1,700,000 yards of excavation are involved.

In digging this tough material, the contractors profited from the 71-B's dependability. They saw it maintain a good pace in areas where other machines wouldn't have stood up. Full air control, not just air assist, on all operating clutches and steering and digging brakes provided full-feel control . . . reduced operator fatigue.

In addition to the 71-B, Bucyrus-Erie Company offers a complete line of excavators from ⅜ to 4 cubic yards. All machines are convertible to crane, clamshell, or dragline front ends. Machines up to 2½ yards are also convertible in the field to hoe front end. Get all the facts on these machines from your nearby Bucyrus-Erie distributor today.

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DAM CONGRESS PLANNERS are Gail A. Hathaway (left), International Commission president, and Francis S. Friel, U. S. committee chairman. They are pictured at ancient Ephesus last fall in Turkey following an executive committee meeting in Istanbul.

Large Dam Congress Planned

Sixth International Congress on Large Dams will be largest ever; raising funds is the present problem

The Sixth International Congress on Large Dams, which will convene in New York City September 15, is destined to be the largest gathering of the world's leading dam authorities ever held. Delegates from all of the 38 member countries of the International Commission on Large Dams will be present as well as large contingents of dam designers and builders from all sections of the U.S. Nearly 300 individuals are members of the U.S. committee of the commission, a threefold increase during the last year.

Gail A. Hathaway, formerly special assistant to the Chief of Engineers, U.S. Army, and now a consultant to the World Bank, is president of the International Commission, the first American to hold this post.

Principal present activity of the U.S. committee, which will be host to the congress, is the raising of funds to insure that the New York meeting and the study tours of dams, which will follow it, will compare favorably with previous congresses held in Stockholm, New Delhi, and Paris. Major financing of these earlier congresses was underwritten by the governments of the host countries, but this source of funds is not available to the U.S. committee, which must rely on contributions from private industry and individuals.

According to Francis S. Friel, consulting engineer of Philadelphia and chairman of the U.S. committee, there is a need for about $25,000 additional to meet the $75,000 budget, which has been set up. Best response so far has been from consulting firms, least from contractors and equipment manufacturers with a stake in dambuilding both here and abroad.

The technical sessions of the congress will be devoted to discussions of papers on four questions: heightening existing dams, stresses and deformations in dam foundations and abutments, compaction methods on earth and rockfill dams, and use of admixtures and pozzolanic materials in dam concrete.

Following the congress, three study tours have been arranged to visit dams in the Southeast, Midwest and Northwest regions of the country. Those attending the meeting can choose any one of these week-long tours, for which the round trip cost from New York varies from $400 to $600, depending on the distances involved. For those attending the meeting of the World Power Conference in Montreal, the week previous, there also will be a study tour covering the St. Lawrence project and the Shippingport nuclear power plant near Pittsburgh.

Briefs

• **State aid for sewerage**—The next session of the North Carolina legislature may be asked to enact legislation to provide funds to help municipalities in their stream sanitation efforts. Chairman J. Vivian Whitfield of the State Stream Sanitation Committee said the step may be necessary because municipal applications for the federal grants exceed the federal allocation to the state under the 1956 Water Pollution Control Act.

• **Big sewer job starts**—Construction of a $25 million trunk sewer to serve 16 Bergen County, N. J., areas, will get under way this month. The project, Stage Two of a long-range pollution control program in the northern New Jersey area, is designed to clean-up the Hackensack River and its tributaries.

• **U.S. Engineers on Iraq job**—Edwards & Kelcey, consulting engineers, Newark, N. J., have been employed by the Development Board in Iraq to furnish engineering services for a 130 mile section of major highway whose construction cost is estimated at $16 million. The road will connect the towns of Diwaniyah and Nasiriyah in the southern part of the country (ENR Dec. 12, 1957, p. 34). The firm has been in Iraq for the last six years as road advisors to the Public Works Department in connection with the work of the U.S. mission there.

• **Ice dam operates**—Excavation is being resumed on the Gorge High Dam of Seattle City Light after a shutdown of more than a year, necessitated by seepage through a controversial ice barrier. City Light took over the original refrigeration equipment and replaced it with heavier equipment, making possible the achievement of temperatures as low as minus 40 F, as compared to the minus 10 F possible with the earlier equipment.

• **Conservation pays**—Farmers practicing conservation save Pennsylvania taxpayers close to $500 a mile each year in maintenance costs, the U. S. Soil Conservation's state headquarters at Harrisburg said recently. Cost of removing mud, repairing roadbank and culverts along an ordinary mile through rural land averaged $512, the report said. By contrast, the cost of maintaining a mile through York County's soil conservation farm areas was only $39. Savings are attributed directly to the farmers, who, by keeping their slopes under better grass and wood cover, and with planned water disposal systems, prevent run-away soil and water from impairing the roads.

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ENR's First Quarter Roundup–

Construction Cost and Estimating Guide

In this first of four Construction Cost and Estimating Guides planned for 1958, emphasis is placed on building costs and the labor and material prices that affect them. Nevertheless, the important cost data pertaining to other types of construction, which appeared in the Oct. 17, 1957 Annual Cost Issue of ENR, are also updated, so that a complete industry picture is presented.

Each of the succeeding quarterly reports will follow this same pattern, but with the special emphasis placed on a different aspect of construction—highways for example, or materials prices or labor costs.

The advantage to the reader, over a single annual report on construction costs, should be more timely cost data presented in more convenient form. For these fast changing times at least, when accurate cost estimating is so vital, the four quarterly reports should keep data current and useful.

As the first quarter of 1958 nears its end, the evidence seems conclusive that the building cost pattern of the past five years will not be altered: Costs will rise, but the rate of rise will be less than in the preceding year. ENR forecasts its 20-cities Building Cost Index will reach 530 in December, based on 1913 = 100. This would be 2.7% higher than December '57, but the smallest year-to-year rise since 1953.

Contractor selling prices also will lose some of their upward momentum this year. Stiff competition for building projects should hold the rise in prices of finished structures to a smaller percentage increase than will be experienced in the costs of basic materials and labor as measured by the ENR cost indexes. Such competition appears inevitable because the volume of available new building projects will drop for the second straight year.

Although most of the major building materials are currently selling at higher prices than a year ago, many materials prices turned downward during the last 6 to 12 months and others may follow suit in '58.

With materials prices more stable than any time since 1953, contractors will face only one major push on costs in '58. This will come from rising wage rates. During the first three months of this year, construction workers won wage increases comparable to the substantial raises received in 1956 and 1957. And others are in unions having long-term contracts—2-3-5 years duration—which provide the workers with sizeable increases to become effective this year plus additional increases thereafter. Recent contractor-union agreements to eliminate wasteful union practices may raise labor productivity, and indeed this is about the only available prospect to offset the continuing rise in wage rates.

The purpose of the pages which follow is to update the construction industry on the latest trends in building costs, over-all selling prices and unit bid prices to the end that estimating and bidding may be as efficient and successful as possible under the conditions that will exist during the balance of the year ahead.

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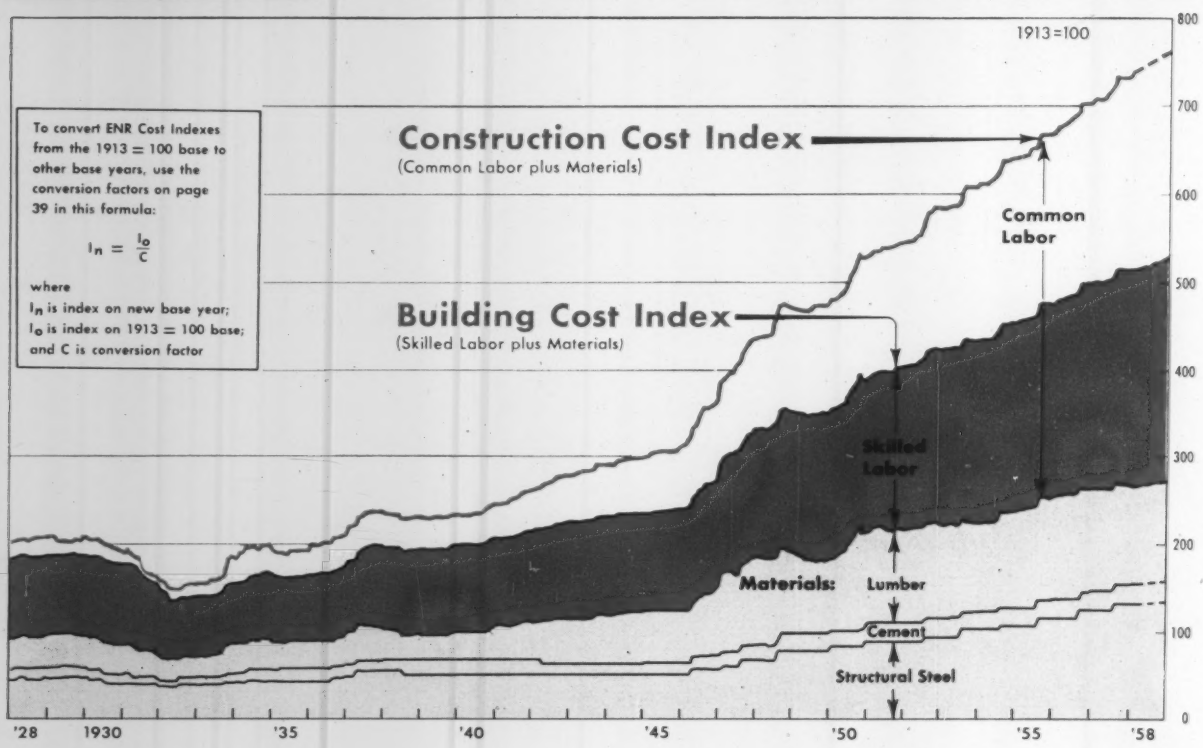
ENR Cost Indexes

The Cost Trend 1928-1958



The Cost Uptrend Slows

BUILDING costs continue to rise for the twenty-second consecutive year, as measured by the ENGINEERING NEWS-RECORD Building Cost Index. The ENR Construction Cost Index is chalking up its eighteenth consecutive annual increase.

These sustained upward marches in costs span a period marked by two wars and three recessions in U.S. economic activity. Costs rose despite price and wage controls established during World War II and the "police action," in Korea. And they moved up in periods of slackening demand for new construction during which contractors bought less materials and labor. While some downturns occurred during the last 18-22 years, these dips were moderate and short-lived so that annual indexes rose continuously.

The chart above shows that the major upward force on costs comes from rising wage scales for construction workers. In the 1950s, the wage push has been particularly strong.

Materials prices also contributed to the inflation of the building cost dollar but overcapacity and shrinking demand have at times (1958, for example) resulted in smaller than average price increases for the three key materials, lumber, steel and cement. In fact, lumber quickly reflects sharp fluctuations in construction demand.

• History and use of ENR indexes—The Construction Cost Index was established in 1921 to track the wide fluctuations in prices following World War I. It was carried back to 1913 by months and to 1903 by years.

The Building Cost Index was established in 1938 when common labor wages moved up faster than skilled. It was skilled labor only; the Construction Cost Index uses common labor only.

Both indexes reprice the three major materials, steel, lumber and cement and four construction trades, common labor, bricklayers, carpenters, and structural ironworkers. The weighting of these components in the indexes is:

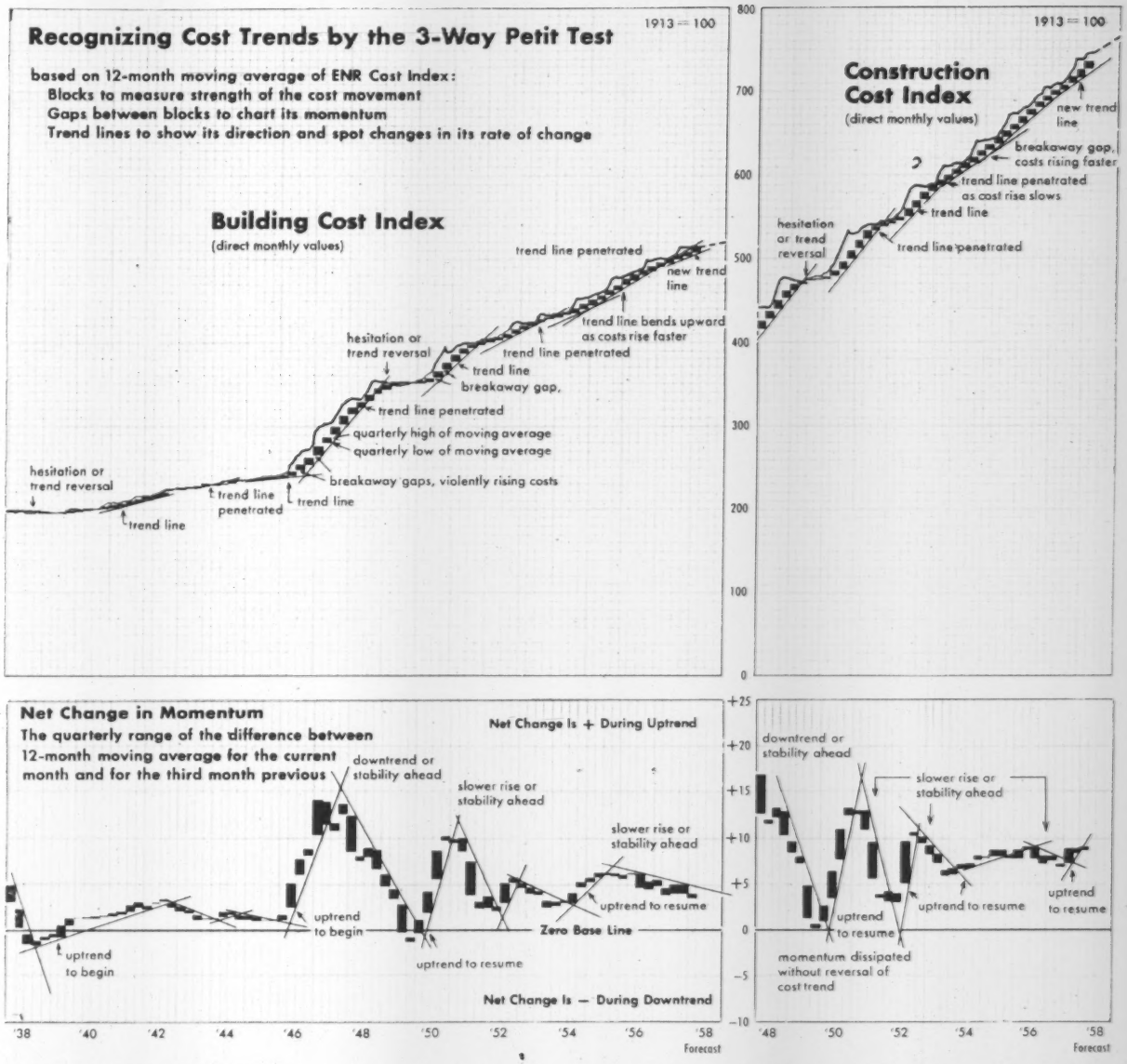
Components used . . .	. . . in construction cost	. . . in building cost
Structural Steel . . . cwt	25	25
Lumber, 2x4's . . . Mbf	1.088	1.088
Cement . . . . . bbl	6	6
Common Labor . . . hr	200	0
Skilled labor . . . . . hr	0	68.38

These indexes measure trends of basic materials and labor costs without correction up or down for low or high productivity of management and labor on the job. In times of low productivity, contractors' selling prices tend to rise faster than the index; when productivity is higher they drop below the index trend. In periods of less extreme changes in productivity, these indexes have a long history of accuracy in predicting degree as well as direction of change in selling prices.

ENR's indexes are used widely to update cost estimates, to establish reproduction costs of structures, to interpolate special purpose but less frequent indexes and to check bids or estimates.

The materials prices and wage rates used in the indexes are repriced weekly and new values published in the Scoreboard page of ENR. The weekly indexes dated closest to the first day of each month are the official monthly indexes for the new month.

Values of both indexes in each of 20 U.S. cities and two in Canada are computed weekly and published in CONSTRUCTION DAILY. The individual city indexes are charted and tabulated on pages 36 and 37 of this issue. These indexes are updated each month in ENR on the Scoreboard page which gives the official monthly values of the indexes for each city.



CHANGES IN MOMENTUM help predict cost movements. When blocks in the top panel penetrate or depart from the trend line, the trend is changing. For advance notice of a trend shift, watch the momentum net change blocks in the bottom panel.

The '58 Cost Outlook—

Wage increases, cement price hikes at some mills and a rise in mill prices of structural steel will cause a further moderate increase in the ENR Building Cost and Construction Cost Indexes between now and December.

Though upward pressures remain evident the building cost rise has lost momentum. The charts above (left) show this in two ways.

The new trend line drawn along the Building Cost Index momentum blocks in the top panel of the chart above has less of a slope than the previous trend line. This means that the uptrend in Building Costs is losing momentum.

The decrease in momentum is easier to see in the lower panel where the blocks magnify changes in momentum. Notice how the latest block in this panel pulled below the trend line (which is heading down). This shows that the Building Cost uptrend is currently losing momentum faster than it did during the preceding two years. However, because the trend line of momentum net change blocks is above the "zero" line, the upward movement of building costs will continue. No downturn is yet in sight.

The Construction Cost Index uptrend regained the momentum lost in the first half of '57 (lower right panel). While the momentum net change blocks increased a little in the last six months, the first quarter '58 block penetrated the steep trend line. These developments signal a 1958 rise nearly as great as in 1957. The relative positions of the momentum net change trend lines indicate the Construction Cost Index will rise by more than the Building Cost Index.

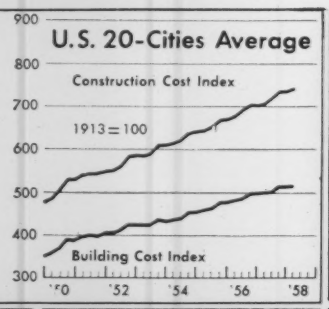
Monthly Index History

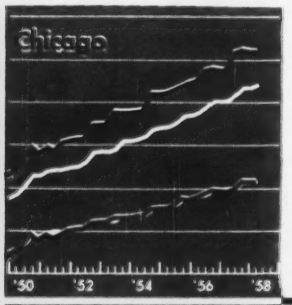
Historical record of ENR cost indexes —graphs and tables—is in the supplement to ENGINEERING NEWS-RECORD, *October 17, 1957. By Business News Department,* ENGINEERING NEWS-RECORD, *P. O. Box 89, Times Square Station, New York 36, N. Y. Reprints are available at $1.00 each.*

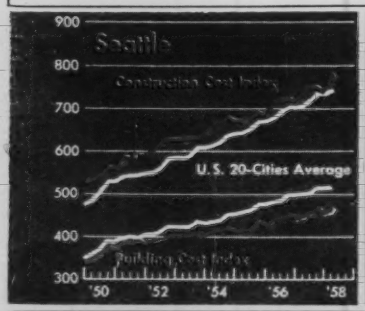
Cost Trends

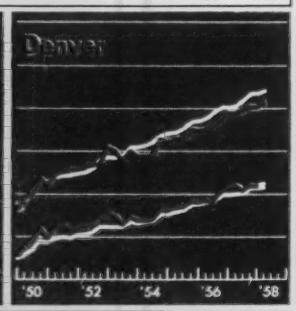
ENR Cost Indexes show how trends in basic construction materials and labor prices in individual cities vary from the trends in the US 20-Cities Averages.

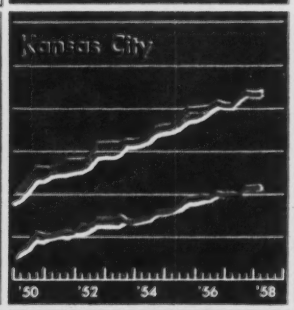
These Indexes are repriced each week. The charts use the official Indexes for the last month of each quarter.

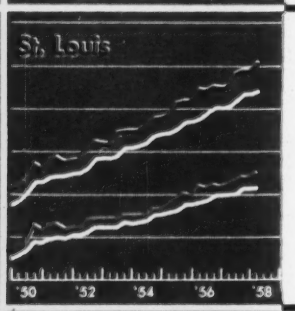


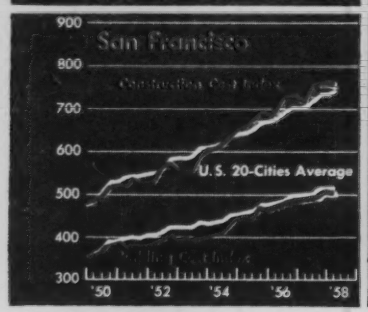


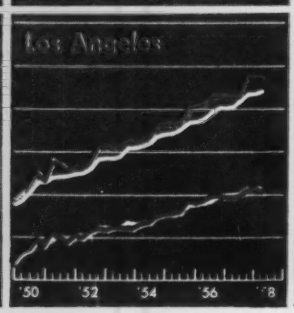


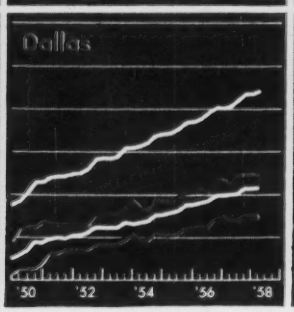


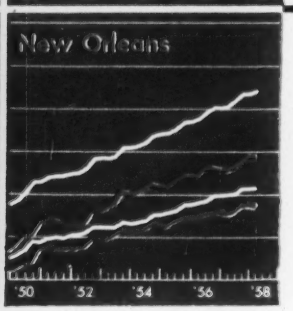












These regional ENR cost indexes show the trend in prices contractors pay for basic construction materials and labor.

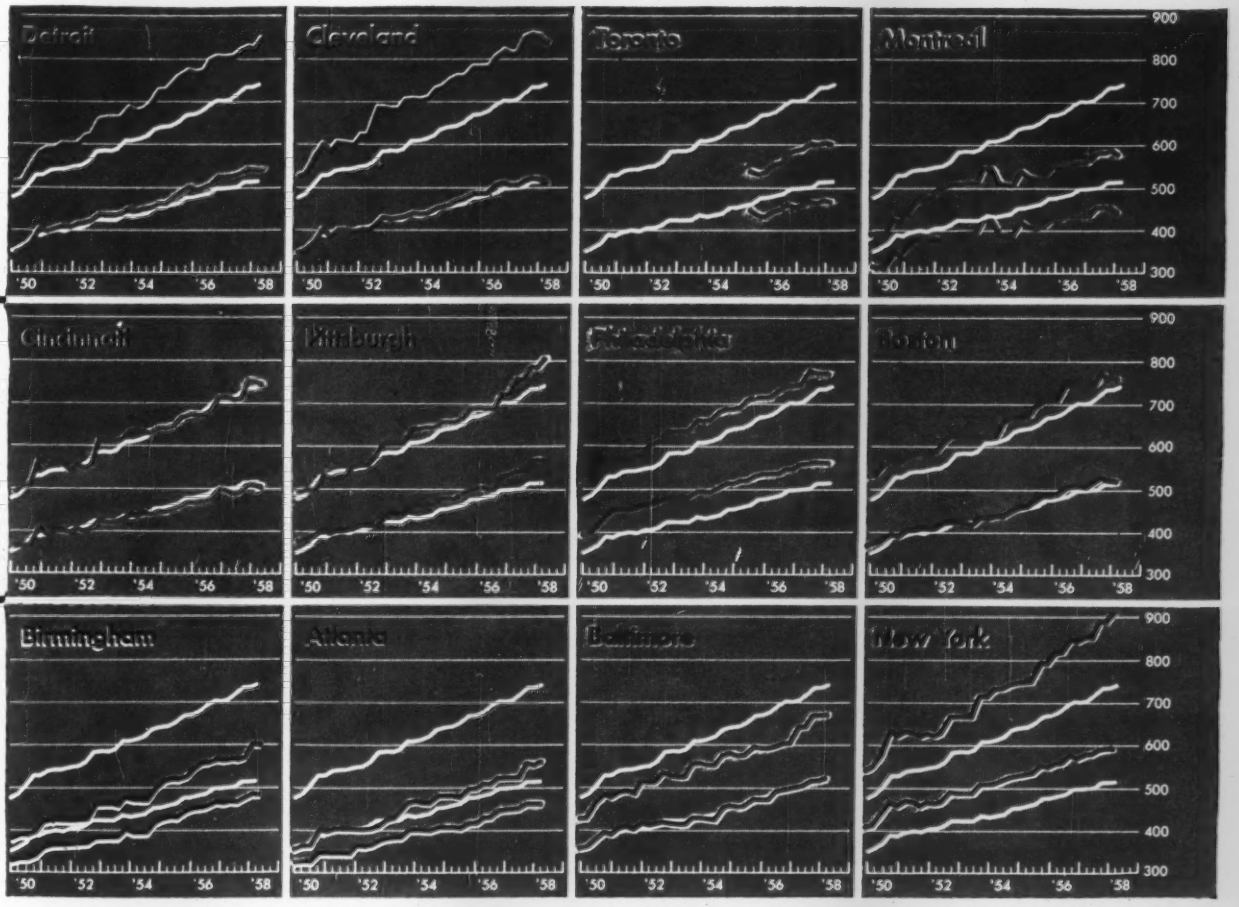
The components of the indexes for each U.S. city are the same as the U.S. average indexes: 25 cwt of structural steel, 3-mill average; 6 bbl of bulk portland cement; 1.088 Mfbm of 2 x 4 lumber; 200 hr common labor (Construction Cost Index); and 68.38 hr skilled labor (Building Cost Index), average rate for bricklayers, carpenters and structural ironworkers.

In Canadian cities, the warehouse price of structural steel has to be used so the steel weighting is 15 cwt. Price of Canadian-made steel is used prior to

Building Cost Indexes 1913 = 100

	1948		1949		1950		1951		1952		1953		1954				1955				1956				1957				1958
	Sep	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar
Atlanta	302	308	308	313	316	330	339	351	358	371	376	392	392	400	400	400	399	417	419	424	424	441	441	442	442	458	456	456	
Baltimore	375	387	349	351	375	387	403	413	414	416	415	418	434	438	455	450	452	472	472	472	491	497	498	499	503	518	520	523	
Birmingham	320	321	329	319	341	347	351	353	358	372	372	386	386	409	420	423	423	434	442	443	447	456	455	457	457	468	476	477	
Boston	363	357	362	37	379	39	407	416	422	425	419	433	436	438	448	453	458	471	488	487	490	503	508	509	507	518	531	523	522
Chicago	360	353	349	353	381	391	[illegible]	413	416	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	469	477	488	486	493	500	507	506	504	511	530	528	527
Cincinnati	374	374	356	362	368	392	398	401	406	420	424	434	435	441	444	445	450	456	467	466	469	475	493	491	486	489	507	504	501
Cleveland	352	339	332	349	379	388	402	403	419	428	435	438	442	451	458	464	472	477	489	489	489	508	515	508	509	522	527	524	512
Dallas	322	322	322	318	323	338	362	374	371	38[illegible]	[illegible]	395	396	[illegible]	[illegible]	[illegible]	406	422	426	428	424	446	449	439	439	451	451	451	
Denver	369	365	351	359	395	400	432	425	433	462	434	441	441	443	468	467	470	474	485	483	487	488	503	519	523	510	522	522	524
Detroit	358	347	336	351	376	400	411	416	424	438	441	446	449	45[illegible]	467	466	481	490	503	498	505	514	528	527	528	535	545	545	545
Kansas City	366	367	357	357	390	406	411	417	434	436	452	442	446	450	466	466	467	477	494	494	497	497	507	503	505	503	516	516	517
Los Angeles	368	356	339	340	380	377	395	398	407	415	421	419	428	433	448	452	453	457	483	479	485	491	497	494	494	496	508	513	507
Minneapolis	370	368	361	363	389	413	421	438	438	454	450	468	468	473	491	492	492	493	502	502	503	515	526	526	527	530	537	537	537
New Orleans	302	310	325	325	340	376	377	379	381	397	407	416	419	422	435	432	431	439	449	449	451	457	462	464	463	467	477	481	478
New York	403	395	398	402	439	439	463	462	465	484	483	507	509	516	526	528	531	533	548	545	553	556	573	569	578	578	590	591	593
Philadelphia	394	391	394	392	415	449	449	461	472	480	479	494	494	503	516	516	521	523	533	535	536	538	548	549	556	560	562	561	561
Pittsburgh	376	384	375	377	387	397	400	416	416	439	440	460	463	463	475	475	478	489	498	506	500	500	529	533	541	541	566	568	569
St. Louis	385	391	375	377	396	421	436	427	444	447	446	455	455	457	473	477	483	495	503	502	523	522	527	525	529	538	546	546	552
San Francisco	350	347	341	345	361	389	380	379	386	399	389	397	399	404	420	411	447	447	468	461	470	476	480	484	485	504	497	506	503
Seattle	328	328	328	341	358	374	384	383	389	400	401	402	412	413	419	414	414	418	436	428	439	444	452	450	452	456	467	458	466
Montreal	314	316	316	314	317	345	378	385	393	395	399	430	396	393	391	422	408	405	412	427	429	437	437	438	437	451	452	453	446
Toronto	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	449	436	432	446	450	465	459	462	469	468	471	470
U. S. Average	357	356	349	353	373	391	401	406	413	425	426	436	437	440	454	457	460	465	479	479	483	489	500	500	501	504	516	516	516

in 22 Cities



the devaluation of Canada's dollar in October 1949; the average of Canadian and U.S.-made steel is used since. Cement's weighting is 10 bbl. Lumber and labor are weighted the same as in the U.S. indexes.

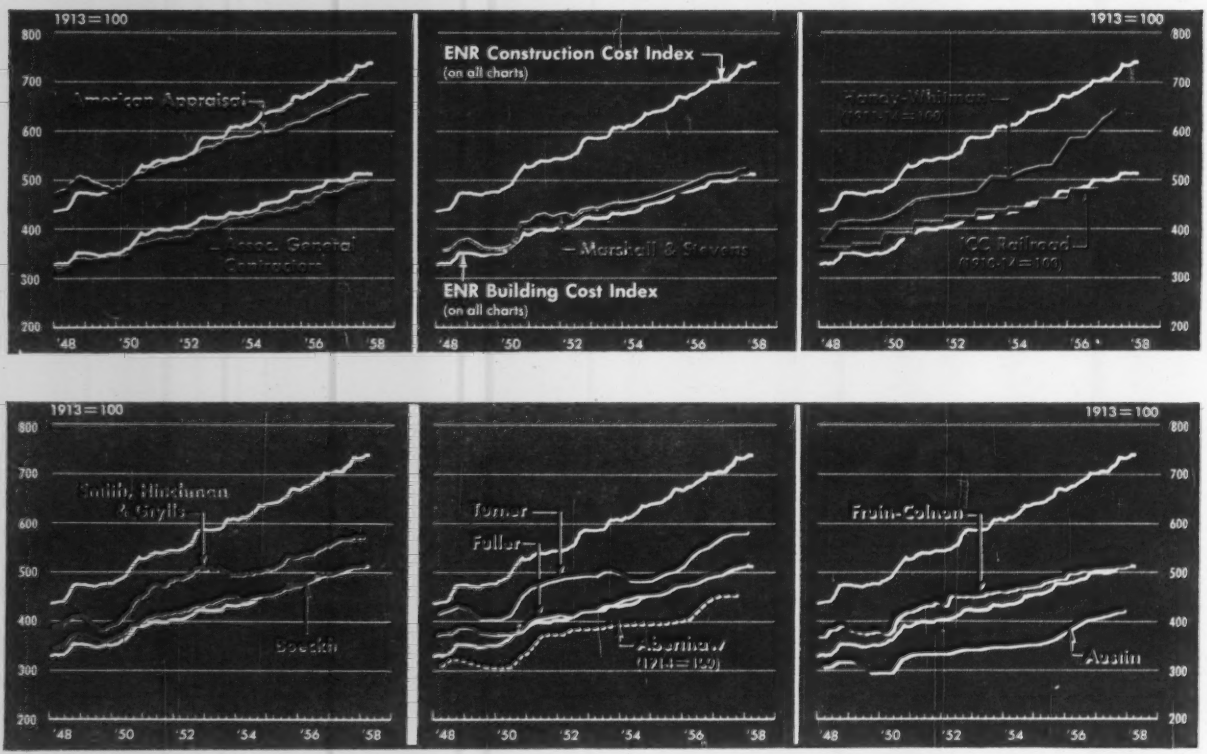
The purpose of these indexes is not to measure relative costs between cities, but major differences between cities are usually due to wage differentials. Low productivity often accompanies low wages.

ENR indexes are uncorrected for productivity changes, so allowances for this factor should be made in estimating end-product price or construction selling price trends based on the cost trends shown here.

Construction Cost Indexes 1913=100

	1948		1949		1950		1951		1952		1953		1954				1955				1956				1957				1958
	Sep	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Jun	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar	Jun	Sep	Dec	Mar
Atlanta	325	345	345	345	354	390	395	395	397	418	438	460	458	458	474	474	474	472	492	495	502	502	522	522	523	523	550	548	558
Baltimore	462	462	425	424	462	474	488	513	511	526	525	553	549	548	573	578	574	575	595	592	591	595	601	602	642	643	670	670	672
Birmingham	378	379	389	377	381	413	416	416	417	450	447	465	465	465	488	507	511	511	519	534	546	549	557	553	556	556	563	593	593
Boston	513	508	526	532	556	563	586	588	614	629	623	624	627	659	669	671	675	696	709	709	712	744	746	747	744	746	773	765	764
Chicago	537	530	526	542	584	593	598	624	626	661	690	690	692	693	734	734	736	741	752	762	769	788	792	790	789	831	838	836	835
Cincinnati	505	505	487	496	510	553	556	548	553	609	613	631	630	630	641	642	645	664	673	671	674	680	717	715	711	713	751	748	745
Cleveland	535	523	514	530	578	587	606	626	685	682	706	708	712	731	738	751	759	762	785	785	785	809	826	819	820	856	861	859	847
Dallas	398	398	398	397	423	438	437	437	437	455	463	482	470	465	487	484	484	488	507	510	512	509	534	534	525	525	547	547	547
Denver	499	496	482	470	506	528	558	564	572	612	582	595	595	597	633	632	635	637	656	653	655	670	680	696	697	702	710	710	725
Detroit	511	500	489	515	555	592	602	601	625	663	663	682	685	700	729	729	743	763	776	772	778	800	810	808	809	823	832	831	832
Kansas City	500	500	501	511	551	570	575	586	588	623	623	630	635	645	661	663	664	685	702	702	705	709	720	715	715	735	742	742	742
Los Angeles	511	495	478	494	529	537	572	569	574	610	612	626	634	640	665	667	667	672	705	708	714	733	736	731	731	731	778	778	773
Minneapolis	512	510	504	512	538	562	587	592	593	628	655	661	661	681	697	697	697	711	720	720	721	747	757	757	758	781	788	788	803
New Orleans	350	354	379	379	402	438	439	435	437	466	486	502	506	516	528	523	522	535	545	545	547	564	567	564	563	572	581	591	588
New York	549	541	534	539	575	622	627	626	629	665	664	713	732	732	742	745	747	750	794	791	816	819	847	842	852	852	890	888	910
Philadelphia	470	467	492	515	541	575	575	582	616	636	635	666	666	681	691	691	696	711	721	721	722	737	747	747	749	780	776	775	775
Pittsburgh	470	502	492	492	499	529	531	557	577	607	608	640	645	645	654	654	657	669	690	695	688	688	727	727	762	762	791	788	804
St. Louis	542	542	508	522	552	569	597	587	608	628	648	654	655	669	684	687	693	720	728	727	737	756	761	759	760	789	796	796	814
San Francisco	490	484	478	483	495	519	533	527	565	559	556	600	602	617	631	649	658	676	690	684	693	726	727	722	720	758	763	761	758
Seattle	512	512	530	530	548	563	586	592	620	635	636	643	664	665	682	676	676	681	693	685	715	720	724	722	746	749	756	747	785
Montreal	406	408	408	394	397	427	473	484	510	512	516	550	516	513	511	542	528	525	532	550	552	560	560	561	560	586	587	591	584
Toronto	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	543	538	554	558	562	592	595	596	611	608	609	607
U. S. Average	478	478	474	480	507	531	543	548	562	588	594	611	614	622	640	643	646	656	673	673	680	692	705	704	709	721	738	738	744

Building Cost & Price Indexes



Contractors' Selling Prices Level Off

Building costs have yet to peak out. But the consensus of ENR and other available indexes is that the uptrend in basic materials and labor costs is tapering off (top row of charts above).

Building contractors' selling price indexes (charts at right in bottom row) now mirror the slower rise in costs. They also reflect the end of materials shortages and price premiums. The Turner quarterly index was unchanged between July '57 and January '58. The Aberthaw semi-annual index dipped 0.5% during the last half of '57.

Other contractor selling price indexes creep upward. The monthly Fruin-Colnon index edged up 0.6% in January after steadying in the last five months of '57. But in February it steadied again. The Fuller quarterly index rose 1.2% in January and the quarterly Austin index crept up 0.4% in December '57.

Two weighted-cost indexes which also cover overhead, profit and estimated changes in productivity—Boeckh and Smith Hinchman & Grylls—show little change since September '57 and February values were a whisker below recent highs (left chart, bottom row).

What these contractor price indexes, appraisal and accounting indexes cover is defined in the following paragraphs:

• **Aberthaw Co., Boston, Mass.**—Since March 31, 1946, a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades. Repriced quarterly using actual and estimated labor and material costs. Before March 31, 1946, based on New England seven-story and basement, 62 ft 4 in. x 202 ft 4 in., reinforced concrete building built in 1914. Quarterly through December, 1956; semi-annual beginnings 1957.

• **American Appraisal Co., Milwaukee, Wis.**—30 cities average used here. See page 42 for definition and values for 22 cities. Monthly.

• **Associated General Contractors of America (AGC), Washington, D. C.**—Wages and materials for 12 cities combined in 40-60 ratio. Wages are prevailing rates for hod carriers and common labor. Materials are weighted: sand, gravel, and crushed stone, 1; cement, 1; lumber, 1; hollow tile, ½; structural and reinforcing steel, ½. Monthly.

• **Austin Co., Cleveland, Ohio.**—Reprices typical one-story, steel frame, monitor-type industrial building. Includes concrete foundations, brick curtain walls, continuous steel sash, concrete floor laid on ground, 2 in. wood roof deck on timber purlins covered with four-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler, or other services. Priced for central and eastern states. Quarterly.

• **E. H. Boeckh & Associates, Inc., Washington, D. C.**—20 cities average for five commercial and factory buildings price indexes used here. See page 40 for values for 10 classes of buildings in 21 of the 47 U. S. cities covered. Monthly.

• **Fruin-Colnon Contracting Co., St. Louis, Mo.**—Five industrial buildings in St. Louis re-priced on basis of contractor's actual and estimated material and labor costs. Monthly.

• **George A. Fuller Co., New York, N. Y.**—Based on price movements of all materials and labor needed to construct four typical buildings: two in commerce, one in industry, and one purely monumental, modified through the years to include all

Building Cost and Price Index History 1913-58

Base Year = 100:	Weighted Cost Indexes: ENR Construction 1913	ENR Building 1913	American Appraisal Company 1913	Associated General Contractors 1913	Marshall & Stevens 1913	Handy-Whitman: Rein Conc Pacific 1911-14	ICC Railroad: Station & Office 1910-14	E. H. Boeckh: Commercial & Factory Bldg 1913**	Smith Hinchman & Grylls 1913+	Contractor Selling Price Indexes: Aberthaw 1914	Austin 1913+	Fruin-Colnon 1913	Fuller 1913	Turner 1913†
1913	100	100	100	100	100	...	...	100	100	...	100	100	100	100
'14	89	92	98	99	97	...	...	98	...	100	105	102	102	100
'15	93	95	101	100	98	102*	101	101	...	100	115	102	130	104
'16	130	131	116	114	112	151*	115	116	...	107	141	108	143	122
'17	181	167	143	152	127	230*	135	142	...	126	172	128	156	147
'18	189	159	177	175	148	233*	154	156	...	147	206	174	160	165
'19	198	159	229	198	185	220	185	172	...	172	198	174	168	195
'20	251	207	283	247	233	225	215	214	...	234	241	227	209	255
'21	202	166	216	200	178	226	192	175	...	179	180	197	188	184
'22	174	155	200	184	172	165	180	162	...	170	157	188	175	176
'23	214	186	224	201	182	191	194	181	190	202	181	217	190	195
'24	215	186	222	202	183	212	193	181	193	198	181	223	194	193
'25	207	183	217	199	185	203	188	179	187	195	185	222	193	195
'26	208	185	217	197	185	191	184	181	185	197	185	218	202	195
'27	206	186	217	200	182	196	189	179	185	193	178	214	197	191
'28	207	188	217	199	184	185	188	179	188	191	172	213	196	191
'29	207	191	217	203	179	191	187	184	190	190	170	211	201	185
'30	203	185	200	200	165	188	182	181	181	186	155	207	199	165
'31	181	168	178	196	156	175	165	168	148	176	131	196	180	145
'32	157	141	155	171	130	157	141	144	128	168	117	178	157	136
'33	170	148	150	163	143	145	145	148	137	170	117	181	155	140
'34	198	167	161	178	156	166	151	161	157	176	128	191	171	160
'35	196	166	162	176	164	174	151	159	161	177	139	185	167	162
'36	206	172	170	179	166	175	157	164	173	184	150	188	168	167
'37	235	196	198	188	180	186	166	183	200	199	165	210	187	187
'38	236	197	199	189	178	199	166	189	200	191	161	207	192	182
'39	236	197	200	188	183	192	166	191	199	190	152	208	195	182
'40	242	203	204	189	190	194	177	195	204	193	163	211	196	193
'41	258	211	217	198	202	201	188	204	217	208	198	220	206	216
'42	276	222	241	209	218	238	208	214	226	223	213	227	229	245
'43	290	229	252	216	227	243	219	223	245	225	215	235	238	258
'44	299	235	261	223	234	243	227	238	264	227	223	241	240	244
'45	308	239	271	231	248	248	244	252	285	236	234	247	241	258
'46	346	262	322	257	288	251	291	275	319	279	273	285	290	318
'47	413	313	430	296	338	328	333	323	371	304	301	347	354	382
'48	461	345	490	332	368	374	364	365	405	321	317	382	380	424
'49	477	352	490	342	365	416	368	369	395	312	307	382	382	413
'50	510	375	500	357	390	420	390	386	426	321	313	398	377	427
'51	543	401	532	377	430	458	412	415	476	370	337	434	405	478
'52	569	416	553	388	436	466	426	430	499	381	342	439	416	493
'53	600	431	577	408	448	477	438	445	504	388	347	460	429	500
'54	628	446	592	426	459	501	442	450	500	394	352	469	450	489
'55	660	469	608	439	479	524	460	465	522	398	366	483	462	498
'56	692	491	635	462	503	588	480	489	544	427	400	503	482	544
'57 Aver	724	509	663	483	515	624	...	507	568	453	420	512	504	576
Dec.	738	516	672	490	524	...	...	512	572	452A	426	514	513B	580B
'58 Jan.	743	517	673	493	...	644	...	513	574	...	...	517	519	580
Feb.	744	516	...	493	...	...	...	512	572	...	...	517	...	...
Mar.	744	516	...	...	...	...	...	...	...	...	...	...	...	...

* Annual values; indexes for 1919-1958 are January 1 values except 1922 which is February 1 value ** Index reported on 1926-29 base
+ Index reported on 1926 = 100 base † Index reported on 1939 = 190 base A July-December period B October

modern innovations of engineering and architecture, such as high-speed elevators, modern lighting, cantilever constructions, lightweight aggregates, etc. Re-priced quarterly on basis of company's experience.

• **Marshall and Stevens, Inc. of Illinois, Chicago, Ill.**—A national average with a system of modifiers to get regional and municipal values for each of four types of building: A—Fireproof, protected steel; B—Fireproof, reinforced concrete; C—Masonry buildings; D—Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment, and labor. Extraordinary or intangible conditions are not included. Quarterly and annual for ENR.

• **Smith Hinchman & Grylls, Inc., Detroit, Mich.**—Actual in-place costs, using building materials costs, freight rates, skilled and unskilled labor rates and including labor efficiency and premiums, bidding competition, contractor profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting, and labor procurement. Monthly.

• **Turner Construction Co., New York, N. Y.**—Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. Quarterly and special as needed.

• **Railroad Construction Cost Indexes ICC, Washington, D. C.**—Stations and office building series used here. See ENR Oct. 17, 1957, p. 93 for definition of this Interstate Commerce Commission analysis of major contracts. Annual.

• **Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore.**—Reinforced concrete building in the Pacific Division series used here. See page 45 for definition and selected values for seven of 103 construction cost elements. Semi-annual.

Converting ENR Indexes* To Other Base Years

To convert from base 1913 = 100 to base below	Divide 1913 = 100 values of Construction Cost Index by	Building Cost Index by
1949 = 100	4.7702	3.5179
1947-49 = 100	4.5033	3.3642
1940 = 100	2.4196	2.0281
1939 = 100	2.3551	1.9744
1926 = 100	2.0803	1.8499
1925-29 = 100	2.0695	1.8648
1926-29 = 100	2.0702	1.8747
1929 = 100	0.0702	1.9086
1910-14 = 100	0.9380	0.9477
1924 = 100	2.1536	1.8578
1923-25 = 100	2.1204	1.8481
1914 = 100	0.8856	0.9191
1911 = 100	0.9343	0.9414

Conversions to other base years are made by simple ratios:

$$I_{nb} = \frac{I_{ob}}{I_{obv}} \times 100$$

where I_{nb} is index on new base, I_{ob} is index value on old base, I_{obv} is old base index value for new base year

* Applies to 20-cities index, not to individual cities

Cost & Price Indexes Continued

–Boeckh Building Cost Index

E. H. Boeckh & Assoc., Inc., 1406 M Street, N. W., Washington, D. C.—U. S. Average 1926-'29=100

Annual Averages By Cities	Residences	Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and				Brick and		
	Frame	Brick	Wood	Conc	Steel	Frame	Steel	Wood	Steel	Conc
U. S. AVERAGE										
1926-29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1956	275.1	283.5	283.1	290.5	284.7	280.0	287.9	283.3	300.2	300.1
1957	273.1	281.4	281.0	287.7	282.2	277.8	283.8	280.9	296.6	297.1
Feb. 1958	272.5	281.9	281.5	291.4	284.2	277.0	288.7	282.1	301.3	302.0
ATLANTA AREA										
1926-29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1956	235.7	237.2	237.4	241.7	244.3	239.1	247.8	235.3	246.4	244.4
1957	239.0	241.2	241.4	248.7	250.3	242.2	257.6	239.7	254.7	252.1
Feb. 1958	238.9	242.6	242.6	253.8	253.0	242.0	263.4	242.2	260.0	259.2
BALTIMORE AREA										
1926-29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1956	266.6	267.5	268.6	260.6	262.0	271.3	260.3	265.2	269.1	262.7
1957	270.2	274.4	275.2	273.4	271.9	275.3	275.5	272.6	283.6	280.0
Feb. 1958	270.4	275.6	276.6	277.7	275.2	274.7	282.1	274.7	289.0	285.1
BIRMINGHAM AREA										
1926-29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1956	234.7	239.8	240.1	240.1	239.0	236.3	236.8	234.9	243.5	246.5
1957	237.9	243.0	243.9	246.8	247.2	239.4	250.7	245.5	253.0	252.3
Feb. 1958	238.4	244.8	245.6	252.6	250.5	240.0	257.2	248.4	260.1	260.1
BOSTON AREA										
1926-29	116.3	120.3	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1956	277.3	284.7	284.6	284.9	281.7	282.6	279.1	281.6	295.6	293.1
1957	283.9	293.2	293.4	298.7	293.1	288.7	296.4	292.3	311.7	308.4
Feb. 1958	281.7	292.1	292.5	299.8	292.9	286.0	299.6	291.6	314.4	310.4
CHICAGO AREA										
1926-29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949	219.2	218.3	216.1	210.6	208.7	220.1	193.3	207.7	210.4	215.1
1956	279.8	283.1	280.6	287.6	279.3	291.7	272.7	271.3	292.5	298.3
1957	285.1	288.9	286.5	295.6	289.3	296.1	288.0	278.1	305.8	310.9
Feb. 1958	283.5	289.4	287.0	302.7	291.9	295.4	293.0	278.9	310.7	315.9
CINCINNATI AREA										
1926-29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946	165.6	166.8	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1956	266.7	276.2	275.4	280.0	272.0	270.7	268.3	277.7	286.4	291.1
1957	272.8	283.3	282.2	290.6	281.5	277.1	283.8	285.4	299.3	302.4
Feb. 1958	271.3	282.9	281.9	292.9	282.6	275.5	288.1	285.5	303.2	305.4
CLEVELAND AREA										
1926-29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1956	286.7	294.4	291.7	296.3	286.1	296.8	277.9	288.8	303.0	308.8
1957	293.9	305.0	302.6	311.0	298.5	302.3	294.6	302.5	320.2	325.1
Feb. 1958	292.9	305.6	303.4	313.7	300.2	300.1	298.1	304.9	323.8	328.2
DALLAS AREA										
1926-29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.6	141.1
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1956	251.5	254.3	255.5	253.9	256.0	254.6	263.3	253.8	262.8	255.1
1957	258.2	263.7	265.5	263.4	264.2	258.4	274.7	267.1	274.8	265.6
Feb. 1958	256.3	262.3	264.1	264.2	263.4	256.1	275.2	266.2	275.3	266.8
DENVER AREA										
1926-29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946	160.1	160.3	159.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1956	269.3	274.9	274.9	275.8	275.3	273.4	277.6	273.7	285.1	282.3
1957	272.1	281.3	281.5	285.4	282.8	274.1	289.1	284.7	296.4	293.1
Feb. 1958	270.1	280.6	280.8	285.9	282.1	271.0	288.5	285.8	296.9	293.8
DETROIT AREA										
1926-29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1956	284.9	292.1	290.3	294.6	285.7	293.1	279.7	287.1	301.4	305.3
1957	288.2	297.8	296.6	303.5	293.4	295.1	292.8	295.7	313.6	315.5
Feb. 1958	287.9	299.9	298.6	308.3	295.8	293.9	297.5	299.6	319.7	321.5

Annual Averages By Cities	Residences	Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and				Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
KANSAS CITY AREA										
1926-29	100.3	100.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1946	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	159.3	160.3
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1956	268.5	273.4	272.6	273.5	270.9	275.5	268.8	268.0	280.0	283.8
1957	271.7	276.9	276.2	280.3	276.8	279.2	280.5	271.5	288.7	290.8
Feb. 1958	270.2	274.5	273.6	280.5	276.3	278.7	283.9	267.1	289.9	290.6
LOS ANGELES AREA										
1926-29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1946	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	158.7
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1956	266.7	272.6	271.7	282.9	278.7	274.4	278.6	265.0	289.3	292.9
1957	267.9	275.4	274.8	292.8	287.8	275.3	297.8	268.9	303.7	303.3
Feb. 1958	265.0	274.0	273.6	297.2	296.8	271.8	307.5	268.7	310.9	308.0
MINNEAPOLIS AREA										
1926-29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946	163.7	167.0	167.5	156.5	155.7	164.9	142.6	168.2	157.2	159.5
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1956	276.8	286.0	285.6	281.2	277.4	279.6	269.3	287.7	289.2	290.9
1957	281.9	292.8	292.7	290.8	285.5	284.1	283.9	295.5	301.5	301.5
Feb. 1958	280.1	291.8	291.9	292.6	286.3	282.2	280.2	294.9	305.7	303.9
NEW ORLEANS AREA										
1926-29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946	148.9	147.7	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1956	244.9	246.5	247.2	244.7	249.2	249.6	247.1	244.3	251.0	247.3
1957	250.4	254.1	255.1	253.7	256.5	253.3	257.3	255.1	261.4	256.7
Feb. 1958	250.4	255.9	256.7	257.5	257.8	252.4	259.8	268.7	265.3	261.9
NEW YORK CITY AREA										
1926-29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.0
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1956	302.2	310.8	309.7	320.1	309.6	309.1	299.3	306.9	324.5	328.6
1957	308.3	318.5	317.2	333.1	320.2	316.0	316.1	315.3	339.8	345.2
Feb. 1958	309.3	320.9	319.4	339.4	324.4	317.6	323.4	317.4	348.1	353.3
PHILADELPHIA AREA										
1926-29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.3
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	105.7
1946	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1956	279.5	284.7	284.4	282.1	277.0	284.3	268.6	283.3	285.7	288.5
1957	283.1	289.0	288.6	291.1	285.4	288.1	280.0	286.9	296.1	297.6
Feb. 1958	283.4	289.5	289.2	295.1	289.2	288.3	284.8	286.6	300.2	300.6
PITTSBURGH AREA										
1926-29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	214.8
1956	281.1	288.0	286.7	283.4	277.0	286.1	262.8	287.1	285.8	291.9
1957	286.4	294.8	293.5	296.5	288.3	292.2	280.8	294.4	302.0	303.8
Feb. 1958	286.1	295.5	294.3	300.2	290.8	291.7	286.3	295.7	306.7	311.5
ST. LOUIS AREA										
1926-29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1956	280.3	288.7	287.6	287.9	280.2	287.8	271.8	288.3	293.3	299.2
1957	283.4	292.0	290.9	295.2	287.0	289.8	285.1	290.3	302.9	307.1
Feb. 1958	285.0	293.7	292.2	300.5	290.4	292.1	291.8	290.8	309.0	312.8
SAN FRANCISCO AREA										
1926-29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1956	270.0	279.0	278.3	288.9	283.4	275.6	281.6	277.3	295.8	298.9
1957	274.4	286.3	285.6	302.9	294.2	278.6	295.8	288.2	310.7	315.2
Feb. 1958	272.8	287.3	286.9	308.0	297.5	276.0	301.9	290.8	316.8	322.1
SEATTLE AREA										
1926-29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946	152.9	158.3	157.9	161.2	159.8	154.3	136.0	158.9	164.2	167.1
1949	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1956	254.0	273.5	273.7	288.5	280.6	251.5	279.1	285.3	299.0	303.4
1957	254.0	275.6	276.0	298.2	289.0	250.9	294.4	288.5	311.2	313.1
Feb. 1958	256.5	279.8	279.8	305.5	292.8	253.8	301.1	293.7	319.8	322.6
WASHINGTON, D. C.										
1926-29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1946	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	159.6
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1956	272.5	274.4	274.1	274.0	272.1	280.4	272.4	267.5	282.6	279.5
1957	280.4	284.3	284.5	289.2	284.8	287.5	290.6	279.1	299.5	295.7
Feb. 1958	279.5	284.4	284.7	291.9	287.0	286.4	296.5	280.1	303.7	300.2

For description of how these indexes are calculated, see page 39

Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

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LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
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New York • Philadelphia

• **American Appraisal Co., Milwaukee, Wis.**—Index is based on detailed analysis of materials and labor required for four types of buildings (frame, brick, concrete, and steel) in 30 representative cities. It is re-priced monthly in accordance with prevailing wage scales and labor performance for the various building trades and quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions. It applies to construction only. Monthly. See table at right for indexes in 22 of the 30 cities covered.

• **U.S. Dept. of Commerce Composite Cost Index**—Weights special purpose and general construction cost and price indexes by estimated dollar volume of construction put in place.

On some types of work, two indexes are used, one special purpose for deflating, the other, available monthly, for interpolating for the months between the less frequent and timely values of special purpose indexes.

By classes of construction the indexes used are: residential, Boeckh; industrial building, Turner—Boeckh; warehouses, office and loft buildings, Fuller—Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics—Boeckh; farm service buildings, BAE—Amer Appr; railroad, ICCRR—ENR Construction; telephone & telegraph, ICCT&T—ENRC; electric and gas utilities, Handy-Whitman—ENRC; petroleum pipeline, HW—ENRC & ICC—ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads—ENRC, Fuller—Boeckh, Turner—Boeckh; highway, BuPR—ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW—ENRC; conservation & development and all other, aver of AGC—ENRC.

Current dollar volume estimates for each type of construction are deflated by the appropriate indexes and the sum of all deflated segments is computed. This sum is divided into the estimated total of all types of construction in current dollars to compute the values of the Composite Construction Cost Index in the table above.

—Building Cost Index—

American Appraisal Co., Milwaukee, Wis., 1913 = 100

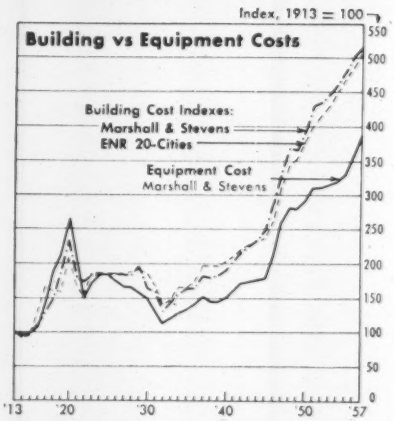
30-cities Average and 22 individual cities.

	'26	'32	'39	'42	'45	'49	'54	'56	'57	Dec. '57
U. S. Aver., for 30 cities	217	155	200	241	271	490	591	635	663	672
Boston	224	169	210	248	270	485	593	644	679	692
New York	234	170	219	248	272	503	626	666	706	711
Buffalo	219	157	205	247	279	506	619	661	705	714
Baltimore	224	166	198	248	277	510	595	638	664	673
Philadelphia	225	161	196	247	275	481	587	625	659	667
Pittsburgh	236	172	219	249	279	486	582	616	648	661
Cincinnati	217	157	209	242	272	477	571	609	648	658
Cleveland	233	160	206	245	268	485	592	640	675	682
Chicago	219	162	205	235	260	452	550	595	614	622
Indianapolis	219	157	206	247	276	501	606	641	669	690
Detroit	224	148	208	252	278	500	625	665	704	711
Milwaukee	218	144	209	254	280	493	615	676	701	707
Minneapolis	197	148	202	235	266	453	553	620	635	639
Kansas City	220	156	209	239	268	469	554	586	603	607
St. Louis	230	163	208	238	265	478	589	634	653	664
Atlanta	211	147	186	240	278	514	643	685	715	729
Dallas	204	146	171	209	246	455	533	563	591	601
New Orleans	217	145	194	234	277	501	604	637	674	684
Denver	204	149	195	226	245	441	522	565	575	582
Seattle	199	141	196	244	277	509	582	632	645	642
San Francisco	188	144	183	225	244	446	534	593	614	622
Los Angeles	195	141	167	213	249	475	556	621	631	642

—Composite Cost Index—

Bldg. Materials & Constr. Div., U. S. Dept. of Commerce, 1947-49 = 100

By years		By months	1949	1952	1953	1954	1955	1956	1957
'34 ... 48		Yr ...	103	119	122	122	125	132	137
'35 ... 47									
'36 ... 48		J ...	106	117	121	121	122	128	134
'37 ... 51		F ...	105	117	121	121	122	129	135
'38 ... 52		M ...	105	117	121	121	123	129	135
'39 ... 49		A ...	104	117	121	120	123	130	135
'40 ... 50		M ...	103	118	121	121	124	131	136
'41 ... 54		J ...	103	119	122	121	125	132	137
'42 ... 61									
'43 ... 65		J ...	102	120	123	122	125	133	138
		A ...	101	121	123	122	126	134	138
'44 ... 64		S ...	101	121	123	122	126	134	138
'45 ... 67									
'46 ... 77		O ...	102	121	122	123	127	134	138
'47 ... 93		N ...	102	121	122	122	127	134	138
'48 ... 104		D ...	101	120	122	122	127	134	138



Industrial Equipment Costs Up 7.8% in '57

The cost of industrial equipment, installed was 7.8% higher in 1957 than in '56, according to the Marshall & Stevens index. This is much more of a rise than the 2.4% increase in the Marshall & Stevens building cost index o rthe 3.6% rise in ENR's 20-Cities Building Cost Index. However, the total cost rise since 1913 is less for industrial equipment than for building construction (see chart above).

The Marshall & Stevens equipment cost indexes show the trend from 1913 to date. The table below shows selected years; annual values for years 1913-47 appeared in the May 27, 1948 Cost Issue of ENR on page 121.

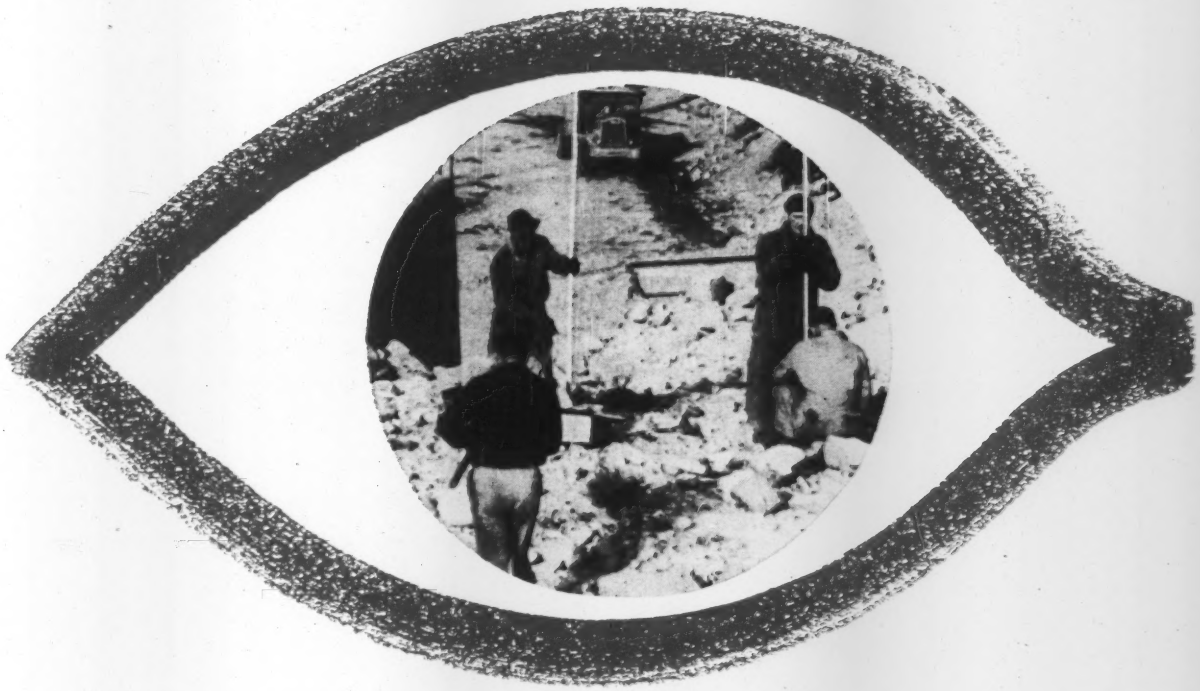
The indexes cover the composite of the entire plant, machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other items are combined in proper proportion to their average occurrence in each plant and computed for 47 industries. Eleven series are reproduced here, five of which are combinations of three or more Marshall & Stevens related series.

—Industrial Equipment Cost Indexes—

Marshall & Stevens, Inc. of Chicago, Illinois, 1926 = 100

Industry	1913	1929	1932	1939	1940	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	Dec 1956	1957	Dec 1957
Average of All	57.9	91.9	66.1	84.8	86.6	103.4	123.2	150.6	162.8	161.2	167.9	180.3	180.5	182.6	184.6	190.6	208.8	218.3	225.1	229.2
Commercial (av. of 12*)	58.8	91.8	67.6	86.8	89.8	105.2	120.9	146.9	158.6	152.7	159.8	171.8	170.6	174.0	183.3	179.8	195.9	203.8	207.8	212.1
Transportation—garage	69.0	91.5	69.2	83.6	84.9	100.9	123.9	157.0	171.1	170.3	179.7	194.6	195.1	197.3	199.0	205.5	227.6	238.9	248.6	251.3
Public utility (av. of 2*)	59.1	91.8	70.1	82.9	84.2	97.5	119.5	145.8	159.6	159.7	164.8	176.1	176.6	178.9	181.7	186.8	204.0	213.5	221.1	224.9
Process (av. of 9*)	59.1	90.5	73.2	83.6	84.4	103.8	123.0	149.1	161.9	161.1	166.6	178.1	178.5	180.2	183.4	188.7	206.4	216.0	223.6	227.7
Food (av. of 10*)	57.8	92.6	68.5	84.9	86.3	104.1	126.1	156.8	169.7	169.2	177.1	189.7	190.2	192.3	194.8	200.7	220.8	231.4	239.4	243.5
Metal working	57.1	92.3	67.9	83.6	88.6	110.7	131.2	151.3	161.8	161.8	166.9	178.0	178.6	180.7	184.1	189.3	206.8	216.3	224.4	228.6
Aircraft	...	93.0	66.7	85.0	88.1	109.8	127.0	162.9	178.3	177.5	186.1	201.0	201.7	204.1	205.8	213.4	236.7	248.4	257.8	262.4
Mach & parts, elec eq	59.2	92.0	68.0	83.4	85.4	106.8	130.3	156.6	167.4	167.7	175.0	188.6	189.2	191.1	194.6	200.2	218.7	228.8	237.5	241.6
Textile	61.1	91.1	67.8	83.7	84.7	101.8	122.1	146.6	157.4	157.3	165.9	192.1	193.3	199.9	199.8	206.6	228.9	239.4	247.8	252.1
Woodworking	56.6	92.0	67.2	83.6	84.6	100.9	123.0	149.6	160.4	160.4	165.5	176.6	177.1	178.9	182.3	187.5	204.7	214.2	221.8	225.5
General (av. of 7*)	59.2	95.5	68.8	84.6	86.1	103.2	122.0	149.7	162.0	161.8	168.2	180.4	180.8	182.5	185.0	190.7	209.4	219.2	226.5	229.8
Cold storage—refrig	59.3	92.0	70.0	82.1	83.1	101.7	125.7	163.2	176.6	175.8	185.2	200.1	200.7	203.1	204.8	211.6	234.3	245.9	254.2	258.9
Contractors' equipment	63.0	91.0	71.9	82.3	83.4	102.5	124.2	150.3	161.1	161.1	166.2	177.3	177.8	179.6	183.0	188.2	205.6	215.1	221.4	230.3

* In each of these groups, **MARSHALL AND STEVENS** reports separate comparative equipment cost trends for:
COMMERCIAL: Apartment, church, hotel, bank, library, restaurant, shool, sctore, theatre, hospital, dwelling, office
GENERAL: Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging
PUBLIC UTILITY: Steam power, electric power
PROCESS: Distillery, cement, chemical, glass, petroleum industry, paint, paper, rubber, clay products
FOOD: Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery, dairy (flour cereal feed), packing-fruit, packing-meat



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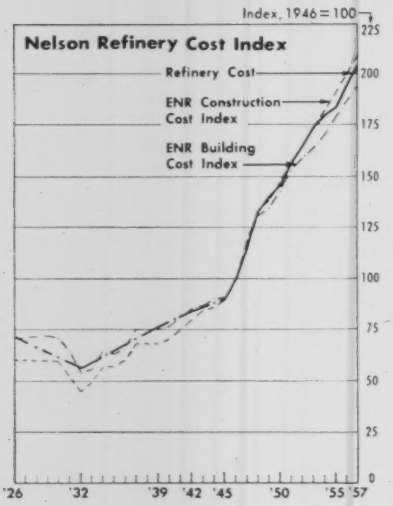
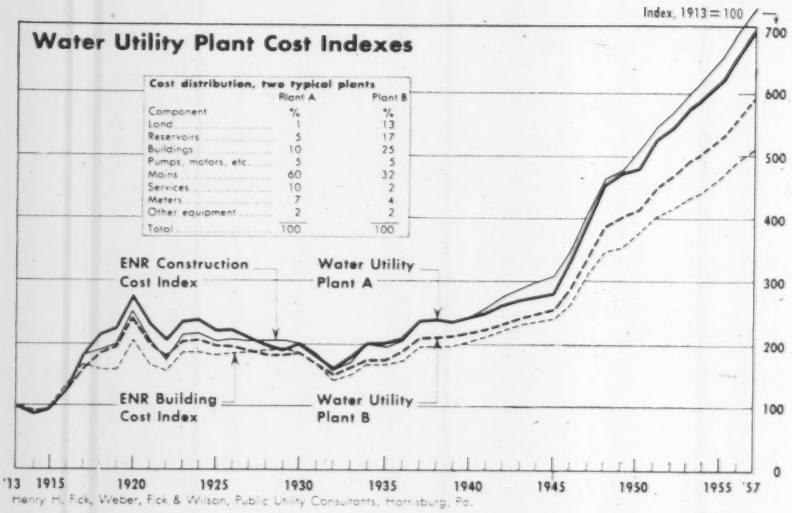




Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.

Petroleum Refinery Costs

The Nelson index applies to the costs of constructing petroleum refinery and natural gasoline plants since 1946 and projected back to 1926. It is published each month in the OIL AND GAS JOURNAL and is based on quotations from manufacturers of equipment used extensively in petroleum refineries and on proportions of steel, common building materials and labor that represent average refinery construction.

The materials component includes two Bureau of Labor Statistics wholesale price indexes—Iron and Steel and Building Materials—and a miscellaneous equipment average published monthly on the Refinery page of the OIL AND GAS JOURNAL.

The materials component (40% of the total index) is computed by converting each of the two BLS price indexes to a 1946 = 100 base. The Iron & Steel Index, on the new base, is then multiplied by 0.6. The BLS Building Materials Price Index, on the new base, is also multiplied by a factor of 0.2. And the miscellaneous equipment price average is multiplied by a factor of 0.2.

Then, all three elements are added to determine the materials component.

The labor component is half skilled and half common labor, taken from ENR. Each of these average wage rates for the current month are divided by their 1946 average to make two wage indexes based on 1946 = 100. Then, each of these indexes is multiplied by a factor of 0.5 and added to get the labor component.

Indexes Used to Develop Fick Waterworks Property Component Cost Indexes—1913=100

	1926	1932	1939	1940	1949	1955	Dec. 1955	1956	Dec. 1956	1957	Dec. 1957
Building											
Engineering News-Record Building Cost Index	185.0	140.9	197.4	202.8	351.8	468.8	478.7	490.8	500.2	508.7	516.3
E. H. Boeckh & Assoc brick & concr comm & factory bldg, Pittsburgh, Pa. area	210.3	161.7	223.9	224.2	413.2	523.3	535.9	548.7	562.4	576.7	586.5
ICC Railroad constr index, station & off buildings, Region 111 (1910-14 = 100)	185.0	142.0	168.0	177.0	369.0	466.0	.....	486.0	.....	.....	...
Handy-Whitman brick buildings index, North Atlantic Division	229.0	175.3	214.0	218.3	423.8	536.0	569.0	578.0	599.0	613.3	622.0
Materials											
6-in & larger cast iron pipe, Delaware River Foundries	220.9	139.3	212.9	223.1	415.2	524.6	537.8	564.2	582.0	594.7	612.9
3-in & under steel pipe, private sources	187.5	171.9	155.4	155.4	249.7	349.2	360.2	372.3	389.8	409.4	420.7
Motors, based on Handy-Whitman Index, North Atlantic Division	134.2	134.0	147.8	147.0	232.0	320.3	338.0	371.0	406.0	419.5	426.0
Contractors' equipment, based on Marshall & Stevens Index	158.7	114.1	130.8	132.4	255.7	298.7	309.0	326.3	341.4	356.2	365.6
Office equip, based on Marshall & Stevens index	136.8	101.1	123.5	127.2	220.9	262.0	267.4	282.6	292.6	299.7	307.8
Meters, private sources	162.5	162.5	147.7	147.7	265.9	351.7	356.2	385.8	395.9	395.9	395.9
Common Labor, based on Engineering News-Record labor index, 20-cities average	288.4	224.7	359.5	367.9	763.2	1,084.7	1,103.7	1,136.8	1,152.6	1,201.6	1,233.7
Construction, based on Engineering News-Record Construction Cost Index	208.0	157.0	235.5	242.0	477.0	659.7	673.1	692.4	703.8	723.9	738.1
Gas utility costs, based on Handy-Whitman index, North Atlantic Division	212.0	174.5	229.6	235.2	432.9	569.0	600.0	621.9	643.5	662.7	679.6

* Replaces Index based on Iron Age Index

Petroleum Refinery Cost Index

Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant, published by Oil & Gas Journal, Tulsa, Oklahoma—1946 = 100

	1926	1932	1939	1942	1945	1949	1952	1953	1954	1955	1956	Jan. 1957	1957	Jan. 1958
NELSON Refinery Construction Index	*72.0	*56.6	*76.6	*83.7	*89.9	139.7	163.6	173.5	179.8	184.2	195.3	201.5	205.9	210.6p
EQUIPMENT														
Heat exchangers	75.0	60.0	76.0	93.5	91.9	133.0	165.8	174.9	171.7	156.8	190.7	197.8	203.6	193.5
Instruments (control)	....	90.0	89.5	85.5	90.6	122.0	146.2	151.8	154.6	162.9	182.1	186.2	187.4	193.2
Pumps, compressors	....	....	91.5	87.5	93.9	135.9	155.6	162.5	166.5	172.2	164.0	202.6	206.7	212.9p
Electrical equipment	81.0	57.0	68.5	74.0	81.8	130.9	152.4	156.4	160.0	162.5	175.0	185.0	188.9	191.6p
Internal Combustion engines	....	....	84.5	84.5	91.7	124.8	146.5	148.1	150.5	153.2	192.0	171.7	173.9	178.8p
Miscellaneous equipment average	*94.0	*79.0	*82.0	*85.0	*90.0	†121.6	153.3	158.8	160.7	161.5	180.5	188.7	192.1	194.0p
MATERIALS	....	68.0	82.0	86.3	89.7	143.6	164.3	172.4	174.6	176.1	190.4	199.0	201.9	203.2p
LABOR	....	49.0	73.0	82.0	90.0	137.1	163.1	174.2	183.3	189.6	198.2	203.1	208.6	215.5

* Approximate, projection back to these dates from other cost sources. p Preliminary
† Used to compute index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown

*Equipment prices, mainly from manufacturers as quoted to Oil & Gas Journal. *Materials Components from Bureau of Labor Statistics Wholesale Price Index, Code 10-1 Iron and Steel and Code 13, Building Materials. *Labor, half skilled and half common labor as quoted by Engineering News-Record. For base costs see ENR Oct. 8, 1953, p 115

Water Plant Cost Indexes

To tailor a special cost index to the peculiar characteristics of any individual waterworks property, Henry H. Fick has come up with seven component indexes, one for each major class of water works plant investment. These can then be weighted and computed to fit the make-up of a specific property.

The way this works is illustrated by the two water utility plant cost indexes, A and B, as shown in the chart on the opposite page. These two plants differ in the ratio of mains to buildings or of services to reservoirs (see table inside the chart).

The seven component cost indexes are designed to show historic cost trends in each of these plant components.

—Waterworks Property— Cost Index Components

Henry H. Fick, Weber, Fick & Wilson, Public Utility Consultants, Harrisburg, Pa.—1913 = 100

Year	Reservoirs	Buildings	Pumps and Motors	Distribution System	Services*	Meters	Other Equipment
1946	346.0	298.7	173.8	360.2	329.9	222.5	185.1
1947	413.2	341.0	210.0	430.5	385.2	235.6	225.3
1948	460.7	394.9	218.8	505.9	439.5	288.9	242.2
1949	477.0	413.2	232.0	519.5	470.5	315.6	237.0
1950	509.6	421.4	251.2	533.3	496.4	336.4	246.3
1951	542.7	448.1	297.0	589.9	528.3	364.5	249.0
1952	569.4	467.1	296.5	613.9	560.1	370.8	248.8
1953	600.0	495.3	308.5	651.6	604.3	384.8	265.7
Dec '53	611.3	507.9	317.0	665.2	620.3	401.0	270.3
1954	628.0	510.2	317.0	673.1	635.1	403.6	270.4
Dec '54	642.7	514.1	317.0	679.5	647.8	405.7	269.7
1955	659.7	523.3	320.3	692.6	665.4	425.0	279.3
Dec '55	673.1	535.9	338.0	707.6	679.9	431.0	287.1
1956	692.4	548.7	371.0	735.9	701.0	460.9	303.1
Dec '56	703.8	562.4	406.0	753.2	717.8	471.6	315.4
1957	723.9	576.7	419.5	776.8	750.1	476.5	326.2
Dec '57	738.1	586.5	426.0	799.2	770.3	479.7	334.9

These component indexes are based on the 13 recognized cost indexes shown in the table (opposite page) for selected years.

The two sample water utility cost indexes shown, A and B, illustrate the effects of historical price changes upon two systems with identical kinds but dissimilar amounts of property.

The basic components of the two systems reflect the approximate dispersion of various classifications of property of two existing Pennsylvania utilities. For simplicity, however, it has been assumed that: 1, all structures are made of brick and concrete; 2, the transmission and distribution systems are composed of cast-iron mains; 3, services are constructed of wrought-iron pipe; and 4, equipment includes motors, pumps, office, and contractors' items.

Whitman, Requardt and Associates, Baltimore, Md.

Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually. Weighting is based on wide experience in cost analysis of plants and construction. Material prices are from ENGINEERING NEWS-RECORD, IRON AGE and various manufacturers; labor rates from BLS, unions and builders associations.

Building Construction (1911-14 = 100)

Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	July '45	Jan. '49	July '49	July '50	July '51	July '52	July '53	July '54	Jan. '55	July '55	Jan. '56	July '56	Jan. '57	July '57	Jan. '58
North Atlantic Division																							
A	213	213	171	159	205	207	250	253	260	436	433	448	479	485	519	534	540	547	608	609	656	676	679
B	228	229	189	173	211	214	246	250	265	429	421	436	474	479	503	523	525	527	569	572	599	616	622
South Atlantic Division																							
A	213	215	171	164	204	205	260	267	275	462	453	469	510	517	556	569	578	587	642	649	695	712	717
B	226	228	185	176	209	211	255	262	277	431	431	439	485	488	516	536	543	551	589	598	625	639	645
North Central Division																							
A	203	201	169	154	200	200	237	242	253	421	418	437	468	481	520	526	533	542	595	603	642	663	664
B	212	211	181	164	203	203	229	234	250	389	390	408	440	453	483	497	503	513	545	554	579	597	600
South Central Division																							
A	192	191	149	144	188	187	232	236	243	411	412	422	454	460	494	504	508	515	566	573	617	630	634
B	203	204	160	154	191	191	223	227	238	382	382	392	424	438	460	474	478	486	520	535	567	578	584
Plateau Division																							
A	198	197	153	149	194	194	230	235	239	402	397	417	451	456	480	495	499	506	556	563	610	625	627
B	211	210	167	163	199	200	221	227	233	396	395	410	442	447	464	481	485	492	520	532	558	573	574
Pacific Division																							
A	191	190	157	148	192	192	238	241	248	416	415	432	463	468	501	518	524	529	588	588	624	644	644
B	198	197	164	156	193	193	226	231	242	386	385	400	435	443	466	479	488	498	536	539	561	578	581

Gas Plant Construction (1911 = 100)

(Complete Index reports 25 Items entering into Gas Plant Construction Costs).
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders.

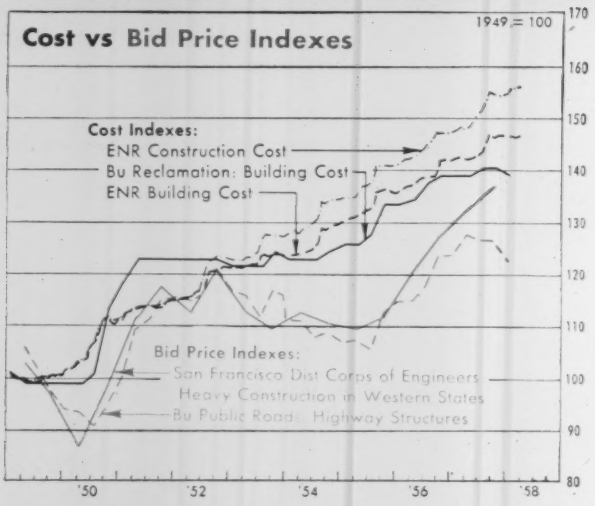
	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	July '45	Jan. '49	July '49	July '50	July '51	July '52	July '53	July '54	Jan. '55	July '55	Jan. '56	July '56	Jan. '57	July '57	Jan. '58
North Atlantic Division																							
A	230	230	202	188	241	249	272	275	288	469	464	476	519	536	561	589	600	605	648	672	695	717	734
B	212	212	209	195	274	278	297	299	301	447	481	485	549	554	590	609	615	615	672	715	772	799	816
South Atlantic Division																							
A	219	222	178	173	227	230	261	268	282	464	453	457	507	520	543	568	581	591	623	651	678	693	714
B	212	212	209	195	274	278	297	299	301	481	482	485	549	554	590	609	615	615	672	715	772	799	816
North Central Division																							
A	217	218	188	178	232	232	249	254	269	435	434	447	489	503	531	554	565	572	602	630	648	672	684
B	212	212	209	195	274	278	297	299	301	447	481	485	549	554	590	609	615	615	672	715	772	799	816
South Central Division																							
A	199	200	171	160	216	217	244	249	261	420	419	429	470	475	496	522	532	538	566	595	614	632	648
B	212	212	209	195	274	278	297	299	301	447	487	485	549	554	590	609	615	615	672	715	772	799	816
Plateau Division																							
A	202	202	176	166	216	217	232	237	243	403	398	405	449	460	476	501	511	517	545	575	595	612	623
B	212	212	209	195	274	278	297	299	301	447	481	485	549	554	590	609	615	615	672	715	772	799	816
Pacific Division																							
A	205	206	187	177	227	228	253	257	266	433	428	437	480	494	516	544	555	561	599	620	638	661	673
B	212	212	209	195	274	278	297	299	301	447	481	485	549	554	590	609	615	615	672	715	772	799	816

Electric Light and Power Construction (1911 = 100)

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs).
A relates to Total Constr. & Equip. All steam; B to Accessory Electric Equipment; C to Sub-Sta. Equip.

	Jan. '26	July '26	Jan. '32	July '32	Jan. '39	July '39	Jan. '42	July '42	July '45	Jan. '49	July '49	July '50	July '51	July '52	July '53	July '54	Jan. '55	July '55	Jan. '56	July '56	Jan. '57	July '57	July '58
North Atlantic Division																							
A	197	194	182	176	224	225	248	248	259	401	400	409	468	480	506	517	519	524	555	577	599	610	620
B	197	196	192	186	225	224	241	239	237	340	341	360	420	430	457	460	461	468	463	490	520	519	536
C	184	178	172	168	203	203	217	216	218	306	312	320	359	366	392	396	396	400	417	444	457	464	477
South Atlantic Division																							
A	201	201	188	180	232	233	262	267	273	430	422	430	490	504	536	547	551	559	589	616	641	651	662
B	200	203	200	191	239	240	260	262	248	357	356	374	431	442	474	482	485	494	484	512	542	546	562
C	187	183	180	173	217	218	235	237	228	322	325	333	370	377	409	417	419	425	439	466	479	491	502
North Central Division																							
A	190	187	186	174	219	218	235	238	243	375	374	382	443	456	489	495	498	504	533	555	575	587	595
B	189	188	199	186	224	223	229	231	218	309	307	324	382	391	419	424	425	432	429	451	477	478	492
C	178	171	181	169	203	202	207	209	200	278	280	286	326	333	359	364	365	369	388	409	419	427	438
South Central Division																							
A	184	183	179	171	218	218	245	246	251	391	390	398	454	465	496	506	508	515	541	567	591	601	611
B	187	189	200	190	231	230	250	248	235	341	340	357	415	423	453	460	462	470	461	488	517	517	533
C	175	171	181	173	210	209	226	226	217	310	311	319	352	356	385	392	394	398	412	438	450	457	470
Plateau Division																							
A	190	188	177	171	218	219	234	236	241	378	378	386	443	454	482	493	495	500	527	553	578	594	601
B	197	196	194	188	231	232	237	236	225	322	323	341	399	408	437	440	441	446	435	457	482	494	508
C	185	177	175	171	209	211	213	212	207	289	294	302	341	347	374	378	378	381	392	413	422	442	451
Pacific Division																							
A	180	178	172	163	216	215	235	242	244	383	389	389	450	459	486	495	499	503	535	557	578	590	600
B	178	177	182	170	222	222	231	240	225	328	323	343	408	413	437	438	440	447	446	471	496	495	517
C	167	161	164	155	203	202	210	219	208	298	297	307	357	359	382	384	385	390	411	435	444	451	469

Heavy Construction Cost & Price Indexes



—Composite Mile Price Index—

U. S. Bureau of Public Roads, 1925-29=100

Year	Excavation [1] 17,491 cy* Bid price	Excavation [1] 17,491 cy* Sub-index	Surfacing [2] 3,726 sy* Bid price	Surfacing [2] 3,726 sy* Sub-index	Structures Reinf. steel 16,000* lb. Bid price	Structures Struct. steel 4,325* lb. Bid price	Structures Struct. concr. 68* cy Bid price	Comb. Sub-index	Composite mile index
'25-'29=100	$0.35†	100.0	$2.22†	100.0	$0.052†	$0.067†	$22.15†	100.0	100.0
1956	38	108.2	3.89	175.5	.131	.202	54.33	253.8	163.3
Q1	37	104.8	3.76	169.5	.124	.192	52.42	243.1	157.5
Q2	38	108.3	3.82	172.2	.128	.197	53.55	249.5	161.1
Q3	39	109.7	4.00	180.3	.134	.205	55.81	260.5	167.2
Q4	39	110.0	3.99	179.9	.136	.215	55.53	262.2	167.4
1957:	40	113.5	4.02	181.2	.137	.218	56.92	267.0	170.0
Q1	39	111.7	4.01	180.8	.141	.215	57.46	270.6	169.7
Q2	40	113.4	4.00	180.3	.137	.221	57.35	268.7	169.8
Q3	40	112.5	4.02	181.3	.135	.225	57.48	268.3	169.9
Q4	41	116.5	4.04	182.2	.135	.210	55.40	260.4	170.6

•[1] Common excav. plus other excav. Items expressed as equivalent common excav.
•[2] Portland-cmt. concr. plus other surfacing expressed as equivalent portland-cmt. concr.
•* Fixed quantities used for establishing price trend. •† Prices used for base year index.

Irrigation and Hydro Cost Indexes

USBR, Office of Assistant Commissioner, Chief Engineer, Denver, Colo. 1949-51=1.0

Class of Construction	1956 Jan.	1956 Oct.	1957 Jan.	1957 Apr.	1957 July	1957 Oct.	1958 Jan.
Composite index	1.15	1.24	1.24	1.27	1.29	1.30	1.30
Dams, earth	1.07	1.17	1.15	1.19	1.22	1.22	1.23
Dams, concrete	1.04	1.12	1.11	1.14	1.15	1.16	1.16
Pumping plants, bldg & equip	1.31	1.43	1.43	1.45	1.46	1.46	1.46
structs, reinf conc, & improv	1.24	1.31	1.31	1.32	1.34	1.35	1.36
equipment	1.38	1.56	1.56	1.58	1.58	1.58	1.58
pumps & prime equip	1.44	1.64	1.64	1.66	1.66	1.66	1.66
access elec & misc equip	1.25	1.41	1.41	1.43	1.44	1.44	1.44
discharge pipes	1.47	1.66	1.66	1.68	1.72	1.72	1.72
Canals	1.06	1.18	1.18	1.20	1.21	1.21	1.19
Conduits, tunnels, free flow, conc lined	1.17	1.24	1.24	1.26	1.29	1.30	1.30
Laterals and drains	1.18	1.26	1.26	1.31	1.32	1.35	1.32
Primary roads	1.12	1.19	1.19	1.23	1.25	1.25	1.24
Secondary roads, unsurf	1.04	1.11	1.13	1.18	1.21	1.20	1.19
Bridges, steel	1.36	1.47	1.47	1.48	1.52	1.52	1.52
Power plants, hydro, bldg & equip	1.31	1.44	1.44	1.46	1.47	1.47	1.48
structs, reinf conc, Imprv	1.24	1.30	1.30	1.31	1.33	1.34	1.36
equipment	1.36	1.53	1.53	1.55	1.55	1.55	1.54
turbines & generators	1.39	1.57	1.57	1.58	1.58	1.58	1.58
access elec equip	1.29	1.44	1.44	1.46	1.48	1.48	1.48
misc equip	1.29	1.43	1.43	1.44	1.44	1.44	1.40
penstocks	1.47	1.66	1.66	1.68	1.72	1.72	1.72
Transm switchyards & substa	1.41	1.59	1.59	1.60	1.60	1.61	1.60
Transm lines, wood pole 115 kv	1.06	1.11	1.09	1.09	1.10	1.13	1.16
Transm lines, steel tower 230 kv	1.28	1.39	1.37	1.39	1.43	1.43	1.43
Permanent genl property, bldgs	1.25	1.30	1.30	1.30	1.31	1.31	1.30

Based on combined costs of material and labor furnished by the contractor, and material and labor furnished by the government on B of R projects in 17 western states and Alaska

Western States Unit Price Index

Estimates Section, San Francisco District, Corps of Engineers, U. S. Army

		1946 1st half	1949 1st half	1955 2nd half	1956 1st half	1956 2nd half	1957 1st half	1957 2nd half
Index, 1st Half '46=100		100.0	132.2	145.36	154.74	164.12	170.37	176.94
Items used in index	Unit	Based on these average unit prices						
Cr rock base course	ton	2.81	2.29	2.90	3.48	3.56	3.41	3.49
Plant mix aggregate	ton	4.82	4.43	6.04	6.19	7.25	6.92	6.26
Plant mix asphalt	ton	22.00	26.85	19.63	21.74	22.18	21.50	24.00
Cover aggregate	ton	5.09	5.65	6.71	6.60	7.34	7.13	3.33
Structural concrete	cy	50.65	65.07	74.00	72.00	78.00	82.00	82.00
Pavement concrete	cy	13.20	19.69	23.00	24.00	20.00	23.00	26.00
Reinforcing steel	cwt	9.60	12.70	13.00	13.00	16.50	17.00	18.00
Cement	bbl	2.84	4.98	4.76	5.04	5.21	5.11	5.12
CM pipe 12"	lf	2.20	3.03	3.72	3.98	4.13	4.48	4.57
CM pipe 24"	lf	4.05	5.26	6.66	6.60	7.29	8.04	7.60
RC pipe 18"	lf	3.50	4.27	5.37	5.91	6.25	6.24	6.46
RC pipe 36"	lf	8.29	10.47	11.23	11.86	13.08	13.75	13.13
VC pipe 6"	lf	1.87	2.39	3.38	3.50	3.55	3.70	3.37
VC pipe 8"	lf	2.22	2.80	3.71	3.99	4.36	3.67	3.99
Sewer manhole	1/10 ea	16.50	20.80	23.00	24.90	25.40	28.20	27.70
Roadway excavation	cy	0.67	0.96	0.95	0.92	1.12	1.05	1.04
Structural excavation	cy	2.49	4.27	3.48	3.63	4.42	5.42	3.66
Watering	M gal	2.13	2.13	1.69	1.76	1.94	1.92	2.00
Flat wheel roller	R-hr	5.47	7.82	7.74	8.15	9.03	10.06	11.72
Piling, gr wood, fur	lf	0.64	0.65	1.20	1.35	1.18	0.895	0.84
Piling, treated, fur	lf	1.25	1.45	1.75	2.00	1.83	2.75	4.13
Timber in place	100 fbm	16.60	26.33	36.70	45.20	49.60	50.50	58.10
2" Galv steel pipe	lf	1.04	1.38	1.74	1.60	1.68	1.62	2.23
Cast-iron pipe 6"	lf	2.86	4.17	3.94	4.54	4.70	5.42	5.32
Cast-iron pipe 8"	lf	3.80	6.47	4.79	5.23	5.83	6.07	6.79
Gate valve 8"	1/10 ea	7.06	9.70	10.40	12.50	12.40	10.08	11.80
Total in dollars		193.65	256.01	281.49	299.67	317.83	329.93	342.8[5]

Competition Stabilizes Bid Prices

Contractors bid prices on heavy construction indicate rugged competition is forcing them to bid closer on new federal-aid highway jobs and other types of heavy construction.

• **Highway bid prices stable**—The Bureau of Public Roads Composite Mile Bid Price Index for the fourth quarter of '57 was only 0.5% above the first quarter. Moderate increases in common excavation unit prices and concrete surfacing account for the slight rise.

By contrast, the sub-index for structures—which weights prices in place for reinforcing steel, structural steel and structural concrete-turned down in the second quarter of '57. And it dropped sharply in the fourth quarter (see chart at top of page) due to declines of 6.7% in structural steel and 3.4% in structural concrete. The break carried structural steel prices more than 2% below the fourth quarter of '56—the first year-to-year decline in two years. Reinforcing bars were also below a year ago (table at top of page).

• **Reclamation index steadies** – The Bureau of Reclamation Composite Cost Index stopped rising in January '58—the first time since April 1955 that the index failed to increase.

Bureau of Reclamation's sub-index for building costs dipped in January '58, the first decline since 1953 (see chart above).

• **Western states index up**—The semi-annual contract unit price index computed by the San Francisco District, Corps of Engineers was still climbing at last report. But the percentage rate of increase slowed in '57. Whereas it rose more than 6% in each half of '56, it increased .8% and 3.9%, respectively, in the two six month periods of '57.

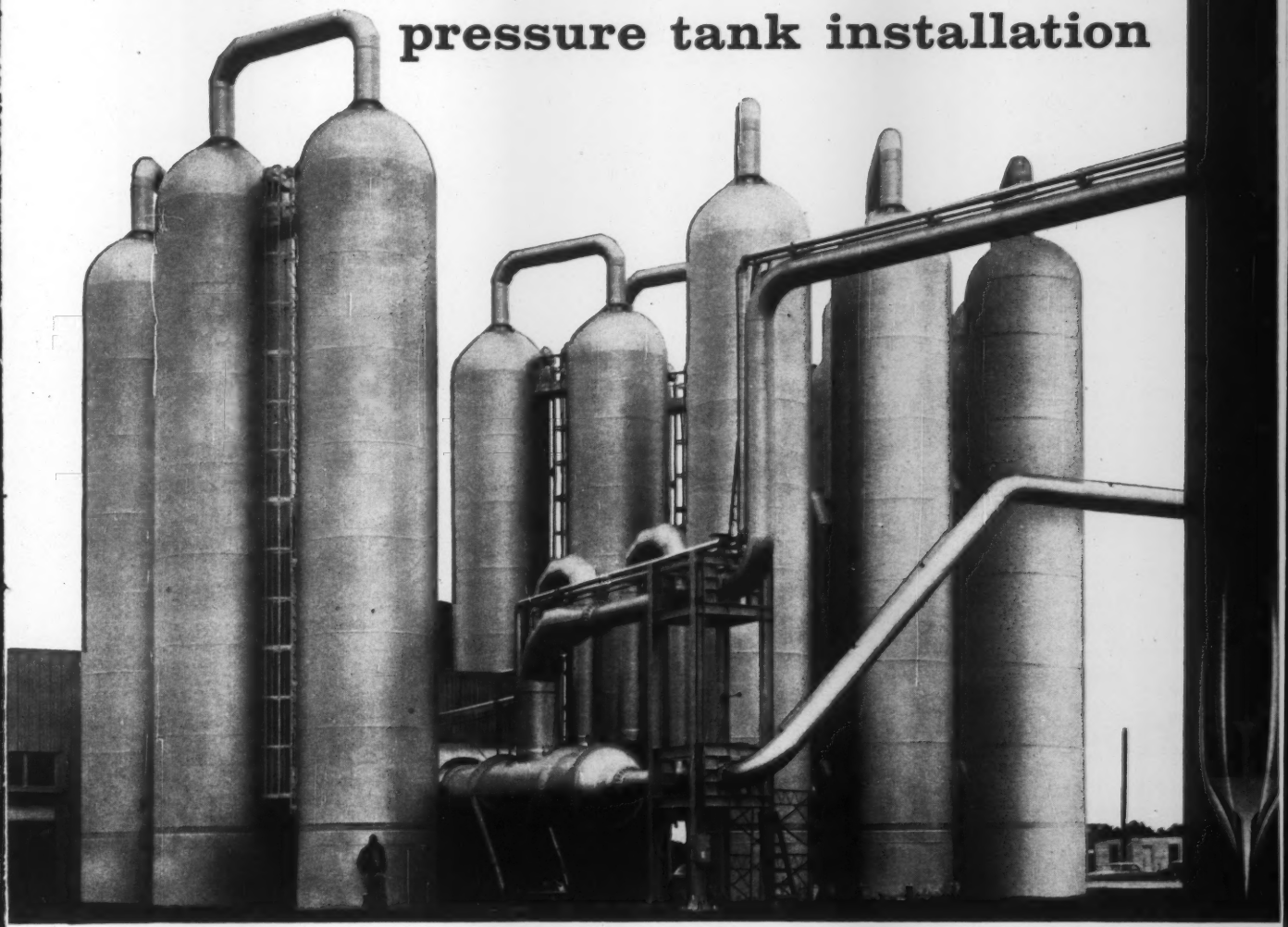
However, it's possible that because this index covers a span of six months, a decline or steadying in bid prices late in '57 is obsured by high bid prices in the third quarter.

For more history of these heavy construction cost and bid price indexes, see ENR October 17, 1957.

SERVING N.A.C.A.'S NEW VARIABLE MACH BLOWDOWN WIND TUNNEL AT LANGLEY FIELD

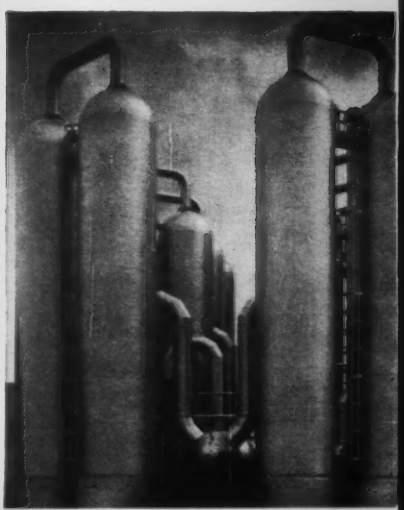
PIONEERING BY PDM STEEL COMPANY

America's first big T-1 STEEL pressure tank installation



12 tanks, each 63 ft high by 11 ft dia, storing air at 600 psia at Langley Aeronautical Laboratory

PDM's important share in the progress of aviation research and test facilities development is exemplified by these pressure vessels for N.A.C.A.'s 20-inch Variable Mach Facility at Langley Field. If made of standard boiler steel, the tank walls would have had to be extremely thick to contain the required pressure. With ground area precisely limited, our previous T-1 experience suggested the use of this high-strength alloy. Our own tests of workability and weldability confirmed the plan, and PDM was awarded the contract at a very substantial saving to N.A.C.A. The tanks were completely fabricated, assembled, welded and tested as units in our shops. ● Let us consult on your special needs.



Pittsburgh-Des Moines Steel Company

Plants at PITTSBURGH, DES MOINES, SANTA CLARA, FRESNO, and CADIZ, SPAIN

Sales Offices at:

PITTSBURGH (25).....3414 Neville Island
NEWARK (2).....1716 Military Park Bldg.
CHICAGO (3)..618 First National Bank Bldg.
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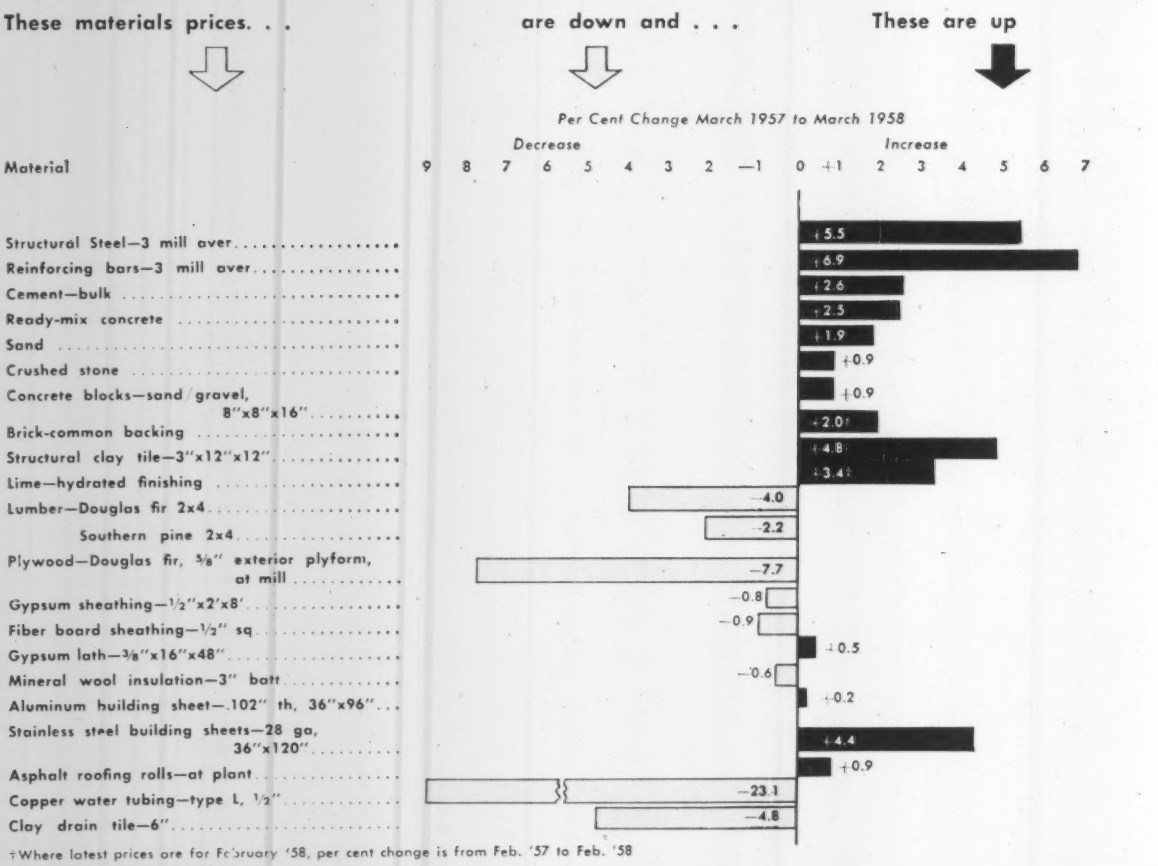
ATLANTA (5)....361 E. Paces Ferry Rd., N.E.
DES MOINES (8).....915 Tuttle Street
DALLAS (1).....1219 Praetorian Bldg.
SEATTLE (1).....Suite 322, 500 Wall St.
SANTA CLARA, CAL.....621 Alviso Road
DENVER (2).....323 Railway Exchange Bldg.

Materials Prices

Price Trends 1957-58

As reported by Engineering News-Record for 20 cities (except as noted)



†Where latest prices are for February '58, per cent change is from Feb. '57 to Feb. '58

Most Materials Prices Up, but Some Drop

Prices of most key building materials are trending upward despite slack demand caused by the decline in heavy construction contract awards.

However, several materials prices fell during the past 12 months (see chart above). And more price declines are probable in the months ahead.

• **Slower rate of increase**—Many of the building materials which rose in price during the past 12 months moved up less than the previous year.

Structural steel, for example, rose 5.5% (July '57) at the mill compared with an 8.7% rise the year before. Reinforcing bars moved up 6.9% last July compared with a 9.1% increase the previous year. But that's only a part of the steel price trend picture.

A drop in the demand for structurals and "re-bars" has ended the shortages of these items and deliveries are now the best in years. No longer do contractors have to pay premiums for scarce steel nor do they have to put up with long delivery lags which cost them money. Structural steel fabricators have cut prices sharply because new bookings are down and many no longer have the big order backlogs they had a year ago.

Cement and aggregate prices are among those materials which are rising but with a lot less momentum. The average price of portland cement, in bulk, this month is 2.6% above a year ago, as measured by ENR's 20 cities average. The rise during the previous 12 month period was 5.1%.

Crushed stone, sand, concrete blocks, brick, lime, aluminum and stainless steel building sheets are also moving up.

Structural clay building tile stands out as one material that has climbed at an accelerated pace in the past year, up 4.8% against 2.7% the year before.

• **Many turn down**—Lumber prices continued to decline, but there are signs that this softening may be ending.

The most spectacular drop in major materials in the last year is the 23.1% fall in copper tubing prices, measured by ENR's 20-cities average.

In the first three months of '58 Douglas fir plywood mills cut prices four times in as many weeks. Mill prices are now 7% to 8% below last year's prices.

Drain tile is also selling below a year ago, and scattered reductions have pulled the ENR averages down a bit for gypsum sheathing, 0.8%, and fiber board sheathing, 0.9%.

ENR's monthly materials price report for lumber, plywood, glass and explosives in 22 cities is on the opposite page. Four other price reports pages are reported each month by ENR. See the listing at the top of the next page for the ENR issues which carried the other four reports and those in which the next reports will appear.

Materials and Labor Prices

Monthly Market Quotations by ENR Field Reporters

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Feb. 27: Next, Mar. 27
- Wage Rates, Building Board, Lath, Insulation: Last, Feb. 27; Next, Apr. 3.
- Cement Aggregates, Ready-mixed Concrete Asphalt: Last, Mar. 6; Next, Apr. 10.
- Iron & Steel Products, Pine: Last, Mar. 13; Next, Apr. 17.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F. O. B.

SOUTHERN PINE AND DOUGLAS FIR

All Southern Pine is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face)

All Fir boards, dimensions, planks No. 2, Fir small timbers and timbers are No. 1. Lengths up to 20 ft. (Prices in italics)

	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	LONG LEAF Y. P. Merchantable grade up to 20 ft. 2x12 Rgh	12x12 Rgh	PLYWOOD Rail freight increment (See note for base price) ⅜"	½"
Atlanta †	$73.00	$76.00	$76.00	$79.00	$81.00	$86.00	$136.00	.....	.....	$121.00	$156.00	$22.32	$27.24
Baltimore *	95.00	100.00	100.00	100.00	100.00	105.00	114.00	.....	.....	170.00	185.00	25.92	31.60
	100.00g	*105.00g*	*125.00g*	*125.00g*	*125.00g*	*125.00g*	*135.00g*	*$150.00*	*$144.00*				
Birmingham †	80.00	82.00	75.00	82.00	85.00	90.00	105.00	.....	.....	115.00	160.00	21.78	26.58
	70.50	*70.50*	*67.00*	*70.00*	*70.00*	*85.00*	*73.50*	*70.50*	*70.50*	.....	.....	.....	.....
Boston ‡	90.00f	90.00f	96.00f	96.00f	96.00f	104.00a	.....	.....	.....	.....	.....	25.92	31.60
	90.00k	*90.00k*	*106.00*	*106.00*	*106.00*	*109.00*	*120.00*	*120.00*	*125.00*	.....	.....	.....	.....
Chicago **	92.00	95.00	89.00	103.00	111.00	112.00	107.00	.....	.....	135.00	135.00	22.45	27.37
	99.00	*99.00*	*112.00*	*110.00*	*110.00*	*111.00*	*119.00*	*119.00*	*119.00*	.....	.....	.....	.....
Cincinnati *	93.00	94.25	86.50	90.50	95.00	102.75	116.00	.....	.....	129.50	127.80	25.00	30.48
	90.25	*91.25*	*95.50*	*97.50*	*98.25*	*109.00*	*121.00*	*121.00*	*121.00*	.....	.....	.....	.....
Cleveland **	90.00	93.00	90.00	97.00	97.00	101.00	.....	.....	.....	.....	.....	25.37	30.93
			96.00	*96.50*	*96.50*	*98.50*	*115.00*	*115.00*	*115.00*	.....	.....	.....	.....
Dallas k‡	70.00	70.00	65.00	65.00	65.00	70.00	140.00	.....	.....	138.00	130.00	18.72	22.80
Denver *	*Not in stock*		*122.50*	*122.50*	*122.50*	*127.00*	*156.00*	*148.50*	*165.80*			13.92	16.98
Detroit ‡	116.80	119.00	115.00	117.00	122.00	122.00	.....	.....	.....	130.00	.....	25.00	30.48
	125.00	*125.00*	*127.00*	*132.50*	*130.00*	*135.00*	*185.00*	*195.00*	*195.00*	.....	.....	.....	.....
Kansas City ‡	120.00	120.00	120.00	120.00	125.00	135.00	.....	.....	.....	.....	.....	16.56	20.16
	130.00	*130.00*	*130.00*	*130.00*	*135.00*	*125.00*	*150.00*	*225.00*	*225.00*	.....	.....	.....	.....
Los Angeles ‡	*90.00*	*90.00*	*90.00*	*90.00*	*90.00*	*90.00*	*119.00*	*130.00*	*130.00*	.....	.....	16.61ab	*20.25ab*
Minneapolis #	*135.00m*	*135.00m*	*140.00*	*140.00*	*140.00*	*140.00*	*185.00*	*185.00*	*185.00*	.....	.....	19.89	24.25
Montreal ab	90.00	98.00	90.00	91.00	108.00	125.00	.....	.....	.....	122.00	122.00	.....	.....
	165.00	*165.00*	*165.00*	*165.00*	*165.00*	*165.00*	*170.00*	*170.00*	*170.00*	.....	.....	.....	.....
New Orleans †	87.00	87.00	94.50	91.00	90.00	97.00	121.50	.....	.....	151.00	151.00	18.72	22.80
†	*105.00*	*105.00*	*99.50*	*115.00*	*115.00*	*115.00*	*127.50*	*127.50*	*147.50*	.....	.....	.....	.....
New York ‡	106.00	107.00	112.00	114.00	114.00	120.00	.....	.....	.....	240.00	250.00	25.92	31.60
	.....	.....	*117.00*	*118.00*	*118.00*	*119.00*	*162.00*	*162.00*	*162.00*	.....	.....	.....	.....
Philadelphia ‡		Range from 100/120				105/125	105/125	.....	.....	214/224	214/224	28.00	32.00
		Range from 110/140				*115/145*	*125/150*	*158.00*	*158.00*				
Pittsburgh 2	120.00	120.00	125.00	120.00	125.00	130.00	145.00	.....	.....	145.00	185.00	25.92	31.60
	130.00	*130.00*	*140.00*	*140.00*	*140.00*	*140.00*	*185.00*	*185.00*	*185.00*	.....	.....	.....	.....
St. Louis #	113.00	115.00	123.00d	123.00d	123.00e	128.00e	.....	.....	.....	.....	.....	18.72	22.80
			131.00	*131.00e*	*131.00e*	*135.00e*	*199.00e*	*199.00*	*199.00*	.....	.....	.....	.....
San Francisco †	*69.00*	*69.00*	*76.00*	*76.00*	*76.00*	*76.00*	*96.00*	*109.00*	*109.00*	.....	.....	12.22	14.91a
Seattle †	*57.00*	*65.00*	*65.00*	*65.00*	*65.00*	*65.00*	*75.00*	*85.00*	*85.00*	.....	.....	.....	.....
Toronto a	92.50	93.50	90.75	90.00	90.00	90.00	.....	.....	.....	92.00	.....	.....	.....
	115.00	*115.00*	*117.75*	*120.00*	*125.00*	*126.00*	*142.00*	*135.00*	*145.00*	.....	.....	.....	.....

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL. 1. Retail, LCL, at yard. # Retail, LCL, deliv. 2. Deliv. truck lots. 3. sad., truckload lots, 8/8 Mtbm

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. °a Spruce. °b Tax exempt. °c 5M lots. °d 8, 10, & 12 ft. lengths. °e 8 to 18 ft. lengths. °f Hemlock °g No. 1 common. °j 8 ft. lengths. °k No. 3 common. °l Incl rail rate from Northwest mills to San Francisco are $11.50 to $15.00 per M ft. bm. From Northern Calif. mills $9.00 by rail, $9.50 by truck. All rates for surfaced stock. For rough, add $3.00 to above figures. °m Up to 16"

PLYWOOD (Ptyform, oiled and edge sealed): Douglas fir, 4' x 8' panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, Interior, moisture resistant, ⅜", $140.00; ½", $161.00. Exterior, waterproof, ⅜" $144.00; ½", $170.00. For other centers add rail freight increment from table on proper size. °a Lower rate by water shipment. °b 50,000 lbs. minimum.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*	
Atlanta	78%c	78%d	$0.2615	Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.
Baltimore	74%d	76%d	.2615	
Birmingham	83%	83%	.2465	
Boston	73-10%	73-10%	.2615	
Chicago	73%	73%	.2615	
Cincinnati	74%	74%	.2615	
Cleveland	74-3-10%	74-3-10%	.3015	
Dallas	76%	76%	.2690	
Denver	74%	74%	.2665	
Detroit	74-10-10%	74-10-10%	.2615	
Kansas City	74-10-10%	74-10-10%	.2665	
Los Angeles	70%	76%a	.2640	
Minneapolis	71-10%	71-10%	.2665	
Montreal	40-10-5%bc	40-10-5%b	$3.05h	
New Orleans	75%	76%	.2665	
New York	79-10%	79-10%	.45g	
Philadelphia	74-10%	76-10%	.2615	
Pittsburgh	72%	72%	.2615	
St. Louis	73-10-10%	72-10-10%	.2665	
San Francisco	60%-25%	68%-25%	.2615	
Seattle	67%	72%	.2640	

Glass: °a Jobbers' list price per box, 14 x 20, as, $42.75 for A quality, $37.80 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. °b sales tax extra. °c 77% for single strength °d Discount 6/15/52. °e 77% for double strength

Explosives: * Cartridges of 1¼", 1½", 1¾", 2", 2½", 2½", 3" diameters. Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas. °g In borough of Kings, Queens, and Richmond and in Manhattan south of Canal St., add delivery charge of $20.00 per trip. °h F.o.b Beloeil (near Montreal), per 100 lb. forcite, 40%. Forcite 60%, $23.80

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E of the Miss., except Fla and Me	$0.2065	$0.2465	$0.2615
W of Miss. to Rocky Mtn. States, Fla. and Maine	.2115	.2515	.2665
Rocky Mtn. States	.2115	.2515	.2665
Pacific N. W. States	.2090	.2490	.2640
Pacific S. W. States	.2065	.2465	.2615

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark off, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail Pine*	Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.51	....
12-in.—2-ft. from butt	6-in.	50 to 59-ft.	.54	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.58	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	....
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	....
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	.80/.83	....
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	.78/.83	.93
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.83/.93	.94
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	....	1.00
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	1.03

* Pine piling over 80-ft. available only in limited quantities

RAILWAY TIES

Prices f.o.b. per tie for carload lots:

		8" x 8" x 8' Untr.	8" x 8" x 8' Tr.	7" x 9" x 8'6" Untr.	7" x 9" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$3.55	Gr. 5 $3.25	$3.33
	Grade 2	1.50	2.35	" 4 3.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.75
Chicago	Red Oak	.....	4.00a	.....	4.60a
New York	S. L. Sap Pine	2.00	4.00	3.00	6.00g
	Mixed Oak	2.50	4.50	3.50	6.50g
Philadelphia	Red Oak	2.95/3.15	4.50/4.70	3.60/3.80	5.50/5.75
St. Louis	Mixed Oak	2.65	3.40a	2.90h	3.75ah
San Francisco	Douglas Fir	1.91af	2.80af	2.69af	4.07caf

Tr.—Treated; Untr.—Untreated. a Creosoted. c Empty cell. e Green f f.o.b. cars. g 7 x 9 x 8' 6" * Add 75¢/tie freight charge to Birmingham. °h 7" x 9" x 9½"

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works	.103
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, f.o.b. works, ton	29.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb	2.30
Soda ash, 58%, in paper bags, per 100 lb. dense	1.70
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works	1.85
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works	14.90

What's Ahead For Construction Wages?

New Wages Up for Talks When New Contracts Are Negotiated in These Cities

City	Common Labor: Building	Common Labor: Heavy Construction	Skilled Labor: Bricklayers	Skilled Labor: Carpenters	Skilled Labor: Structural ironworkers
Atlanta					
Baltimore					
Birmingham					
Boston	Apr 1	Apr 1	Apr 1	Mar 31	
Chicago				May 31	May 31
Cincinnati	Jun 1	Jun 1	Jun 1	Jun 1	Jun 1
Cleveland	May 1	May 1	May 1	May 1	May 1
Dallas			Jul 1	Aug 1	Apr 1
Denver			May 15		
Detroit	May 1	May 1	May 30	May 1	May 1
Kansas City			Mar 31		
Los Angeles			May 1		
Minneapolis					
New Orleans	Apr 30	Apr 30	Apr 30	Apr 30	Apr 30
New York			May 31		Jun 30
Philadelphia			Apr 30	Apr 30	Jun 30
Pittsburgh	May 31	Dec 31	May 31	May 31	Jun 30
St. Louis					
San Francisco			Jul 31		
Seattle	Dec 31	Dec 31	Jul 1	Jul 1	Dec 31
Montreal					
Toronto	Apr 30	Apr 30	Apr 30	Apr 30	Apr 30

Increases Are Already Scheduled to go Into Effect Later on for These Unions

City	Common Labor: Building	Common Labor: Heavy Construction	Skilled Labor: Bricklayers	Skilled Labor: Carpenters	Skilled Labor: Structural ironworkers
Atlanta	Jul 1: 10¢	Jul 1: 10¢	Jul 1: 15¢	Jul 1: 10¢	
Baltimore	Mar 31: 10¢	Mar 31: 10¢	Oct 1: 15¢	Apr 1: 15¢	Aug 1: 15¢
Birmingham	Sep 1: 15¢	Sep 1: 15¢	May 1: 10¢ + Sep 1: 10¢	May 1: 10¢ + Sep 1: 10¢	Jul 1: 10¢
Boston					
Chicago					
Cincinnati					
Cleveland					
Dallas					
Denver				May 1: 5¢	
Detroit					
Kansas City	Apr 1: 10¢	Apr 1: 10¢		Apr 1: 20¢	Apr 1: 15¢
Los Angeles	May 1: 20½¢	May 1: 20½¢		May 1: 15¢	
Minneapolis	May 1: 15¢		May 1: 15¢	May 1: 15¢	May 1: 15¢
New Orleans					
New York	Jul 1: 10¢	Jul 1: 10¢		Jul 1: 10¢	
Philadelphia	May 1: 10¢	May 1: 10¢	May 1: 13¢		
Pittsburgh					
St. Louis	May 1: 12½¢	May 1: 12½¢		May 1: 12½¢	May 1: 12½¢
San Francisco	May 1: 18¢	May 1: 18¢		Jun 15: 15¢	Aug 16: 22½¢
Seattle					
Montreal	Apr 1: 10¢	Apr 1: 10¢	Apr 1 10¢	Apr 1: 10¢	Apr 1: 10¢
Toronto					

Wage Hikes to Give Costs a Big Push

Wage increases this year again will exert great pressure on construction costs. In fact, higher wages will account for most of the predicted 1958 rise in ENR's Construction Cost and Building Cost Indexes (see page 33.)

The pattern for 1958 wage hikes is taking shape. During the first three months of this year common labor unions and certain skilled trades received pay rate boosts averaging 10.5 cents per hour in seven of the 22 cities covered by ENR's cost indexes. That's just the beginning, however, because many more unions in the 22 cities also will come up with wage increases between now and the end of the year.

Many of the laborers, bricklayers, carpenters and structural ironworkers in 11 of the ENR 22 cities will receive deferred raises that their present contracts schedule to go into effect some time this year (see chart above). These deferred wage increases range between 10 cents and 20 cents per hour.

Furthermore, many unions will negotiate new contracts to replace those expiring this year. It's a safe bet that the unions in 16 of the 22 cities where new contracts are negotiated, will ask for—and get—wage hikes. Although rising unemployment in construction may temper the wage demands presented by some unions, the substantial deferred increases that other unions are to receive will serve as a spur to unions bargaining for new contracts.

• **Big raises in Seattle**—Among cities reporting wage advances in the first quarter of '58, Seattle has the biggest boosts. Common labor on both building and heavy construction received increases of 19 cents per hour, while carpenters' and structural ironworkers' wages are up 19 cents and 15 cents respectively. Atlanta reports the smallest first quarter wage advances. Carpenters and common labor on building and heavy construction received 5 cent hikes, and bricklayers wages are up 15 cents per hour. Other cities with wage boosts of 7 to 15 cents in the first quarter are Denver, Minneapolis, New York, Pittsburgh, and St. Louis.

Automatic common labor wage increases for '58—provided by existing contracts in half of the 22 reporting cities—range from 10 cents per hour in Atlanta, Baltimore, Kansas City, New York, Montreal, and Philadelphia to 20½ cents per hour in Los Angeles. Other cities anticipating common labor wage hikes are Birmingham, Minneapolis, St. Louis, and San Francisco.

• **Negotiations coming up**—A busy bargaining season is ahead—especially for bricklayers whose contracts will run out. Nearly all of the expiration dates fall in the middle two quarters of the year.

Most of the eight common labor wage agreements expire during the second quarter of '58. Skilled labor wage agreements, for carpenters and structural ironworkers, expire in 11 cities in the first two quarters of the year, with the exception of the structural ironworkers contract in Seattle.

ENR publishes wage rates for selected construction trades in 22 U. S. and Canadian cities each month. These reports last appeared in ENR February 27, p. 68 and will appear again on April 3. Wage rates in 55 cities as of September 1, 1957 were reported in ENR October 17, 1957, pp. 160-161.

Our paver tipped and crashed

...but we were out from under in more ways than one

(Based on Company File #61474)

It was a job we'd done often—loading our paver for transport. But this time the ground was wet and uneven. When the paver was halfway loaded, the lowboy slipped out from underneath. Fortunately, nobody was hurt. But it would have cost us $850 in repair bills if it hadn't been for our Hartford Contractors' Equipment Policy.

* * *

Suppose that paver had been *yours*. Would you have had to dig down for the repair money?

You wouldn't have had to—with the protection of a Hartford Contractors' Equipment Policy.

Our policy covers your equipment on the job . . . in transit . . . in temporary storage. It protects you against losses by overturn, fire, theft, explosion, collapse of bridges—against losses by landslide, collision and many other hazards.

Don't take chances. Make sure you'll have cash to pay for repairs or replacement of your equipment. Call your Hartford Fire Insurance Company Agent or your insurance broker—*now*.

Year in and year out you'll do well with the

HARTFORD Fire Insurance Company GROUP

Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey
Hartford 15, Connecticut

New York Underwriters Insurance Company
New York 38, New York
Northwestern Fire and Marine Insurance Company
Twin City Fire Insurance Company
Minneapolis 2, Minnesota

Hartford Fire Insurance Company Group
Hartford 15, Conn. Dept. FE-9

Please send me more information about the advantages of a Hartford Contractors' Equipment Policy.

Name_____

Firm_____

Street_____

City_____ Zone____ State_____

Utah Construction Company

moves 10,500,000 yds. of sand from bay floor, to build 400-acre coastal development

In an effort to keep up with California Bay Area's fast-expanding population, the Reclamation Bureau of Alameda is creating a new 400-acre coastal tract along the south shore of Alameda, on San Francisco Bay. This monumental reclamation project will provide for much-needed commercial and residential expansion.

Estimated to be completed by 1960, the development will ultimately include 1000 homes . . . plus multiple dwelling units, shopping centers, a professional and administrative zone, schools, churches and parks. A public beach along the perimeter will add to recreational facilities.

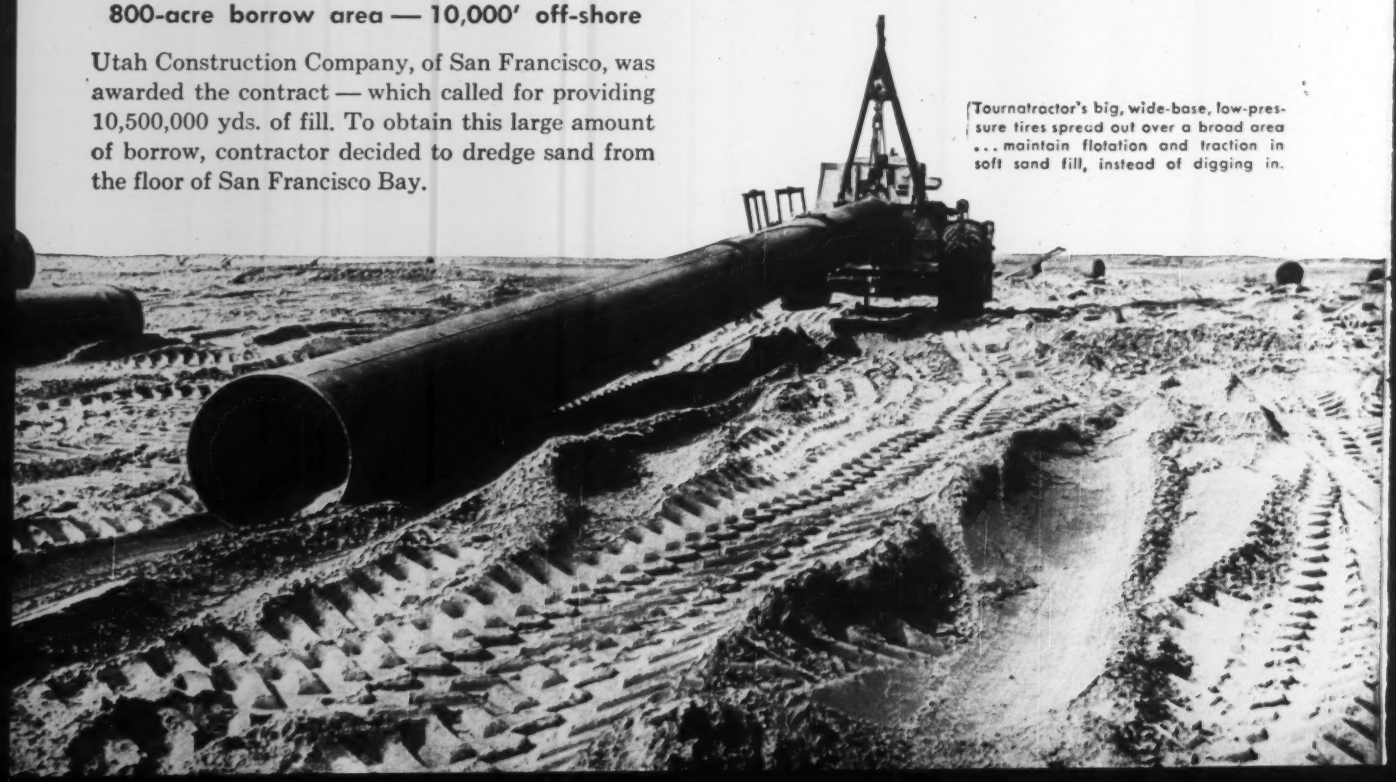
800-acre borrow area — 10,000′ off-shore

Utah Construction Company, of San Francisco, was awarded the contract — which called for providing 10,500,000 yds. of fill. To obtain this large amount of borrow, contractor decided to dredge sand from the floor of San Francisco Bay.

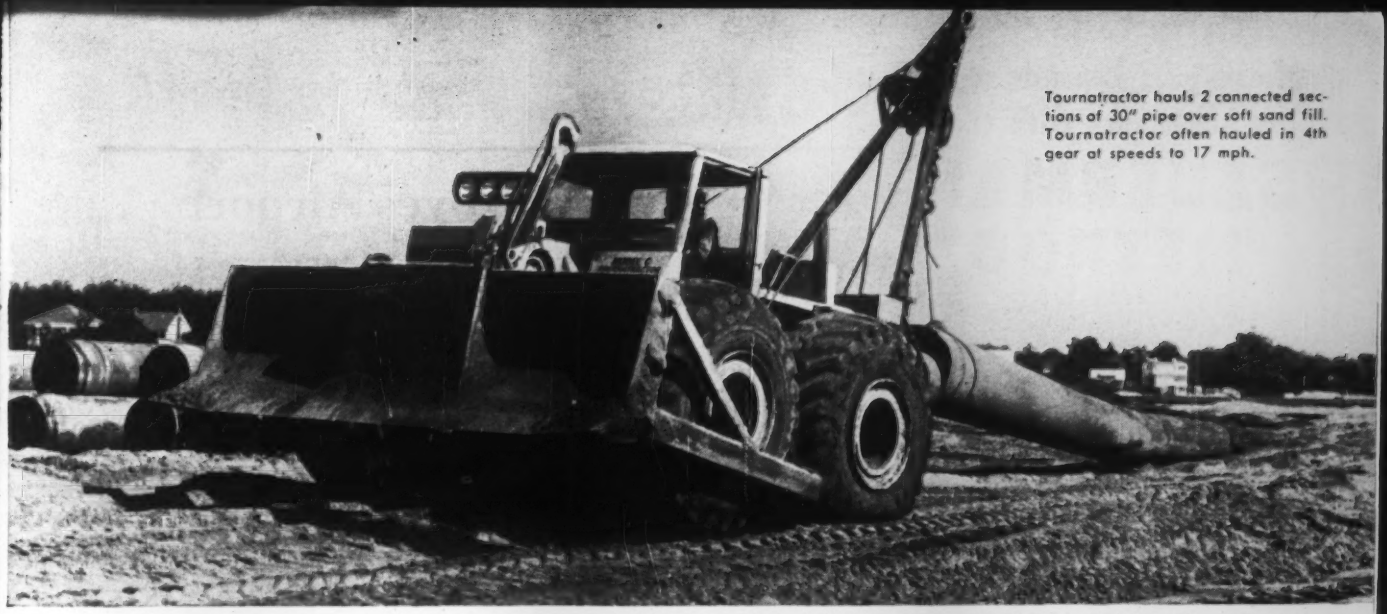
The borrow area — approximately 800 acres in size —was located in San Francisco Bay, 10,000 ft. from original shore line. Its location was established by soil mechanic engineers, after exhaustive tests to locate material that would best meet fill requirements.

1,850 cu. yds. per hr., 168 hrs. per week

Using one of the largest electrically-powered dredges in the world, Utah's Dredging Company pumped sand to shore — 24 hours a day, 7 days per week. This floating-dirtmover produced an average 1,850 cu. yds. per hour. On shore, a network of 40,000 feet of 30″ pipe was continually being moved and changed to assure proper placement of fill.



Tournatractor's big, wide-base, low-pressure tires spread out over a broad area . . . maintain flotation and traction in soft sand fill, instead of digging in.



Tournatractor hauls 2 connected sections of 30" pipe over soft sand fill. Tournatractor often hauled in 4th gear at speeds to 17 mph.

To move the 40′ long, 3,000-lb. sections of pipe, contractor first tried using a crawler tractor and sled combination. This method was soon found to be expensive. Due to continuous operation in loose, abrasive sand, the crawler's tracks deteriorated rapidly, and had to be replaced every 30 days.

Use high-speed, rubber-tired Tournatractor®

Utah Construction then called in their rubber-tired LeTourneau-Westinghouse 17 mph Tournatractor. Unit has a rear-mounted boom crane — which is operated electrically by Tournatractor's double-drum power-control-unit. This big, high-speed tractor on rubber skidded an average of 12 lengths of 40′ pipe per hour.

Handles wide variety of jobs

When not hauling pipe, contractor made good use of Tournatractor's high speed and mobility to handle odd jobs around the construction area. Tournatractor built access roads, levees, and moved mats for draglines. Moving these mats took Tournatractor only 15 minutes.

Get complete facts

Find out for yourself how this LeTourneau-Westinghouse rubber-tired Tournatractor can *save you money* on a major percentage of your tractor work. Write or phone for complete details.

CT-1334-DC-2

Sling man hooks cable onto pipe. Tournatractor's ease of operation and excellent visibility enable operator to work confidently and efficiently.

At a moment's notice, Tournatractor can be dispatched to handle emergency dozing jobs anywhere in the area. A mile is only a few minutes away for this high-speed rubber-tired tractor. Unit travels over abrasive sand, concrete, blacktop, railroad tracks, without damage.

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

these jobs were done at a lower cost with the

SAUERMAN METHOD

Silt Removal by Slackline Cableway keeps channel clear for irrigation project. Bucket digs, then conveys spoil to downstream side of dam. (*Sauerman News 146*).

Digging Gravel for a plant supplying aggregate for 82 miles of turnpike, this 5-yd. DragScraper often operates around the clock. It has excavated over a million tons. (*Sauerman News 145*).

Reclaiming Material to hopper from all sections of a 500-ft. warehouse, the estimated operating cost of this DragScraper Machine is 2.1 cents per ton. (*Sauerman News 145*).

You'll find a complete description of the Sauerman Method in Catalog A, DragScrapers; Catalog C, Slackline Cableways; and Catalog E, Bulk Storage by Scraper.

SAUERMAN BROS., Inc. 632 S. 28th STREET BELLWOOD, ILLINOIS

Los Angeles Improves Airport

Portland cement pavement at $4.90 per sq yd is more than 25% of $1.8 million contract

Fifteen bidders vied for improvements to the Los Angeles International Airport for the City Department of Airports. Unit prices seesawed in close bidding between the low bidders, but Griffith Co.'s bid of $4.90 a sq yd for 16,670 yd of 12" PCC runway and 78,910 sq yd of taxiway pavement, swung the award in their favor. This $1,799,995 contract includes:

Group	Amount of Contract	% of Total
B — Runway and taxiways	$1,073,551	59.6
D — Remove existing airport maintenance yard	12,000	0.7
E — New airport maintenance yard	240,503	13.4
F — Service road	104,235	5.8
G — Box storm drain for power line easement	31,102	1.7
Additive Alternates		
1 — Local and international plane maintenance sites	207,085	11.5
2 — Box under east end of east-west runway	58,490	3.2
3 — Pave high-speed turnoffs	73,029	4.1

Bids were taken in three groups for the runway and taxiways. The award was on the combination of Parts I and II of Group B, which was similar to Group A, but Group C omitted a number of items and called for 80,000 cu yd less of excavation and 7,500 sq yd less of taxiway pavement. There were also variations in the sq yd content of the bituminous prime coat and the crushed aggregate in all groups.

Wages prevailing in the Los Angeles area include: Carpenters, $3.325; tractor operators, including bulldozers, $3.57; motor grader operators, $3.66; truck drivers, $2.705-$2.905; common labor, $2.575, all including fringe benefits.

The bidding on the runway and taxiways went like this:

Group A		
1	Griffith Co., Los Angeles, Calif	$1,071,283
2	S. A. Cummings, Compton, Calif	1,130,970
15	Webb & White, Los Angeles, Calif	1,475,006

		Part I	Part II
Group B			
1C	Griffith Co., Los Angeles	$943,300	$130,252
2	S. A. Cummings, Compton	991,377	
2	Oberg Constr. Co., Inglewood, Calif		138,103
15	Webb & White, Los Angeles	1,290,569	
15	R. R. Hensler, Sun Valley, Calif		232,205

Group C		
1	Griffith Co., Los Angeles	$943,400
2	S. A. Cummings, Compton	991,377
15	Webb & White, Los Angeles	1,313,969

(*Continued on page 56*)

Runway and Taxiways		Group A			Group B						Group C		
					Part I			Part II					
		Sta 0+00 to 89+25			Sta 0+00 to 64+00 and 73+00 to 89+25			Sta 64+00 to 73+00			Sta 0+00 to 64+00 and 73+00 to 89+25		
Bids: 11-13-57		Quan-	Unit Prices		Quan-	Unit Prices		Quan-	Unit Prices		Quan-	Unit Prices	
Items	Unit	tity	1C	2	tity	1C	2	tity	1C	2	tity	1C	2
Clear and grub	ls	job	$14,000	$6,268	job	$14,000	$6,268	.....	.....	.....	job	$14,000	$6,268
Salv runway, taxiway lights	ls	job	500.00	512.00	job	500.00	512.00	.....	.....	.....	job	500.00	512.00
chain link fence	lf	3,600	0.20	0.19	.....	.....	.....	3,600	$0.20	$0.25	.....	.....	.....
PCC pavement, break up	sy	5,000	0.30	0.185	.....	.....	.....	5,000	0.30	1.00	.....	.....	.....
remove	sy	500	1.75	1.23	.....	.....	.....	500	1.75	2.00	.....	.....	.....
AC shoulders, break up	sy	2,200	0.35	0.06	.....	.....	.....	2,200	0.35	0.50	.....	.....	.....
N-S runw, CMPA 18"x11", remove	lf	134	2.20	1.64	134	2.20	1.64	.....	.....	.....	134	2.20	1.64
Excavate	cy	314,000	0.54	0.534	234,000	0.57	0.534	80,000	0.47	0.45	234,000	0.57	0.534
CMP culv, 12 ga, 24"	lf	216	11.00	9.30	.....	.....	.....	216	11.00	13.00	.....	.....	.....
30"	lf	794	12.00	11.45	794	12.00	11.45	.....	.....	.....	794	12.00	11.45
36"	lf	232	16.00	13.50	232	16.00	13.50	.....	.....	.....	232	16.00	13.50
48"	lf	296	23.00	17.30	296	23.00	17.30	.....	.....	.....	296	23.00	17.30
CMPA culv, 10 ga, 50"x31"	lf	212	21.00	20.30	212	21.00	20.30	.....	.....	.....	212	21.00	20.30
Inlet struct #2	cy	9	110.00	98.00	9	110.00	98.00	.....	.....	.....	9	110.00	98.00
Outlet struct #2	cy	81	44.00	49.00	81	44.00	49.00	.....	.....	.....	81	44.00	49.00
RC Headwall, tp A	ea	10	350.00	350.00	8	350.00	390.00	2	350.00	300.00	8	350.00	390.00
Conc encase 1 duct bank	lf	510	2.00	2.02	510	2.00	2.02	.....	.....	.....	510	2.00	2.02
4	lf	4,415	4.50	4.40	3,980	4.50	4.40	435	4.50	5.00	3,980	4.50	4.40
6	lf	241	7.00	7.24	241	7.00	7.24	.....	.....	.....	241	7.00	7.24
8	lf	700	10.00	9.96	455	10.00	9.96	245	10.00	10.00	455	10.00	9.96
Markers, duct end	ea	88	2.00	13.86	76	2.00	13.86	12	2.00	15.00	76	2.00	13.86
Bit prime coat, 146,900 sy	t	157.5	37.00	31.70	.....	.....	.....	.....	.....	.....	.....	.....	.....
128,500 sy	t	.....	.....	.....	133	37.00	31.70	.....	.....	.....	133	37.00	31.70
18,400 sy	t	.....	.....	.....	.....	.....	.....	25	37.00	40.00	.....	.....	.....
Base crse, cr agg, 146,900 sy	cy	35,100	5.00	5.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
128,500 sy	cy	.....	.....	.....	30,600	5.00	5.50	.....	.....	.....	30,600	5.00	5.50
18,400 sy	cy	.....	.....	.....	.....	.....	.....	4,600	5.10	5.00	.....	.....	.....
Test rolling 100	sf	36,500	0.22	0.06	32,450	0.22	0.06	4,050	0.22	0.05	32,450	0.22	0.06
Bit tack coat, 4,000 sy	t	4	55.00	54.50	4	55.00	54.50	.....	.....	.....	4	55.00	54.50
surf crse, minus agg 2", 102,000 sy	t	10,800	5.30	6.30	.....	.....	.....	.....	.....	.....	.....	.....	.....
91,650 sy	t	.....	.....	.....	9,690	5.30	6.30	.....	.....	.....	9,690	5.30	6.30
10,500 sy	t	.....	.....	.....	.....	.....	.....	1,100	5.30	5.25	.....	.....	.....
minus agg 3", 44,800 sy	t	7,180	5.00	6.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
36,900 sy	t	.....	.....	.....	5,900	5.00	6.00	.....	.....	.....	5,900	5.00	6.00
7,900 sy	t	.....	.....	.....	.....	.....	.....	1,260	5.00	5.25	.....	.....	.....
Asph pave, 85-100 penet	t	1,045	26.00	24.00	900	26.00	24.00	140	26.00	23.00	900	26.00	24.00
PCC pave, 12", runway	sy	16,670	4.90	5.36	16,670	4.90	5.36	.....	.....	.....	16,670	4.90	5.36
taxiway	sy	78,910	4.90	5.20	71,410	4.90	5.20	7,500	4.90	5.60	71,410	4.90	5.20
Marking runway, taxiway	ls	job	1,100	1,060	job	1,000	980.00	job	100.00	100.00	job	1,100	980.00
N-S runway lights, reinstal, rewire circuit	ls	job	700.00	680.00	job	700.00	680.00	.....	.....	.....	job	700.00	680.00
Dust palliative	sy	123,600	0.03	0.09	112,600	0.03	0.09	11,000	0.03	0.05	112,600	0.03	0.0
Seeding	ac	150	200.00	249.00	135	200.00	249.00	15	200.00	225.00	125	200.00	249.00
CI watermain, 12", lower	lf	730	6.50	7.00	730	6.50	7.00	.....	.....	.....	730	6.50	7.00

Ahead of schedule . . . thru mud and bad weather

Supt. credits power-transfer differential for cutting lost time when going gets soft

Hatcher Bros. Inc., Mingo Junction, Ohio, is relocating 1.67 miles of U.S. 62, at Brinkhaven, Ohio . . . constructing a grade separation to eliminate a low, narrow underpass. Work includes grading, drainage, structures, and paving . . . completion scheduled Sept. 1958. Initially, company's fleet included one Le-Tourneau-Westinghouse 210 hp C Tournapull® with 18-yd. Fullpak® scraper, 3 competitive 20-yd. scrapers, 4 crawlers, and a grader.

Began project in mid-winter

Contractor began 210,600-yd. dirt-moving in January 1957 . . . worked thru wet, muddy winter and spring weather. Hatcher Bros. found that Tournapull worked productively in very muddy conditions — in footing that stopped other machines.

As scraper work progressed, the company needed rock haulers, and so acquired a 17-yd. (22-ton) C Tournapull Rear-Dump. The original C 'Pull* scraper was also converted to a Rear-Dump by interchanging a Rear-Dump trail-unit for scraper, behind same prime-mover. Another Tournapull scraper — 9-yd. Model D — was purchased. And a 150 hp L-W grader, Adams* Model 660, was added to speed spreading of fill, and to maintain haul roads and cuts.

Worked in mud and bad weather

In early April, the 2 L-W Rear-Dumps were put on double shift. After a total of 4 months, 95% of all dirt work was completed. Supt. E. W. Ellis estimates the 3 Tournapulls handled ⅔ of the yardage, even though the combination of competitive units have bigger load capacity.

Mr. Ellis reported, "We are now ahead of schedule because we could work our Tournapulls in the worst weather. That special differential really pays off when the going is soft. And we have had little down-time with our machines."

Hatcher Bros. Inc., first used 210 hp Tournapull prime-mover with 18-yd. Fullpak scraper to move dirt in late-winter slush . . . then switched to this interchangeable Rear-Dump trail-unit for hauling rock. Contractor used 2 such Rear-Dumps to build an overpass approach on U.S. 62, at Brinkhaven, Ohio.

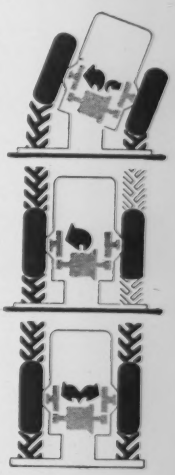
Build overpass approach

Photos show Tournapulls completing the last 5% of dirtmoving. C Rear-Dumps are hauling rock, D Tournapull moving dirt, building-up approach to the new U.S. 62 overpass. Here, in fair weather and foul, Tournapulls have proved they'll move dirt at lower net-cost-per-yard.

Call or write us for complete information on Tournapulls . . . with 9, 18, or 27-yd. scrapers . . . or with 11, 22, or 35-ton Rear-Dump. Ask us to show you how exclusive power-transfer differential keeps these speedy haulers moving more dirt, more days per year . . . for more profit per yard.

Hatcher Bros.' 138 hp, 9-yd D Tournapull scraper spreads fill on-the-run. Unit was able to "lap" larger competitive scrapers on 3900' cycles, due to faster loading (sometimes self-loading), higher-speed haul, and fast, tight turns on the fill. Grader coming up to spread dirt is a 150 hp Adams 660.

Tournapull differential gives you extra traction and pull-power



Exclusive power-transfer differential always keeps pull-power on the drive-wheel with better traction. When a Tournapull wheel tends to spin, a simple, maintenance-free unit resists the spinning, and *automatically* transfers up to 4 times as much power and tractive effort to the other wheel on firmer footing. Thus, you can keep your Tournapull rolling — hauling dirt at a profit — when other rigs are "stopped-cold". Arrows in diagram show apportionment of tractive effort in conditions of: good footing (bottom) . . . loss of traction on one wheel . . . turning.

*Trademark CRDP-1660-DCJ-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

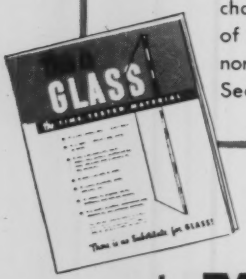
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

Wire glass is *the only glazing medium* that can successfully withstand the fury of the flames in this dramatic Underwriter's Laboratory test. To qualify as Fire Retardant No. 32 the glass is first subjected to temperatures ranging up to 1600° F, and later to a ¾" stream from a fire hose at 35 to 40 lbs. pressure. Passing the test requires that the glass remain in the sash substantially unchanged except for cracking due to thermal shock. For positive protection that no glass substitute can offer, insist on Mississippi Wire Glass, the *original* upon which the Underwriters' standard was based in 1899—the standard today by which all others are judged.

Insist on GLASS *for Glazing*

Glass and glass alone possesses the desirable characteristics of chemical stability, permanence of finish, color and shape, surface hardness and non-inflamability. Buy—specify—insist on glass. See your Mississippi glass distributor.



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. . . Unit Prices

The bidding for the other items in the contract went like this:

Group D—Remove Existing Airport Maintenance Yard	Lump Sum Bid
1C Griffith Co., Los Angeles, Calif	$12,000
2 R. R. Hensler, Sun Valley, Calif	18,500
15 Peter Kiewit Sons Co., Calif	45,000

Group E—New Airport Maintenance Yard	
1 Oberg Constr. Co., Inglewood, Calif	$206,520
2 Matich Constrs., Colton, Calif	207,372
7C Griffith Co., Los Angeles, Calif	240,503
15 MacDonald & Kruse, Sun Valley, Calif	278,224

Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	7C
8 Armco bldgs, fndn & slabs	cy	400	$50.00	$56.00
reset bldgs	ls	job	4,000	18,000
Incinerator, fndn	cy	11	90.00	80.00
rehabilitate	ls	job	2,500	3,000
Fence, chain link, relocate	lf	630	1.25	1.00
salvaged, i	lf	500	0.70	0.60
Conc block wall	ls	job	8,000	8,500
Gate, 4 pr salvaged dbl dr i	ea	1	65.00	60.00
4' single f&i	ea	1	40.00	80.00
Gasoline, island & pad	sf	500	1.25	1.60
& diesel fuel tanks, salv i	ea	3	350.00	750.00
pumps i	ea	3	325.00	330.00
Waste oil storage tank i	ls	job	550.00	600.00
Hose reel, gasoline island	ea	2	185.00	220.00
Garage pipe & mech install	ls	job	5,000	3,200
Interior plumbing	ls	job	8,000	13,000
Piping, domestic water	ls	job	4,000	3,500
gas	ls	job	3,600	3,500
Electrical distribution	ls	job	14,000	14,000
RCP, cl 1000 D, 36"	lf	320	14.00	20.00
1500 D, 18"	lf	206	8.00	8.00
Drain, 4" for garden bldg	lf	125	2.75	4.00
MH, storm drain	ea	1	400.00	450.00
weir #1, B3461	ea	1	800.00	550.00
drop "S"	ea	2	600.00	700.00
Junction structure B	ls	job	550.00	300.00
Catch basin	ea	2	450.00	475.00
Wood bumper, parking lot	lf	400	2.00	1.30
Grade new maint area & access road	sf	165,000	0.026	0.03
Asph stab base, 5"	sy	13,750	0.70	1.25
Bit tack coat	t	13	60.00	60.00
surf crse, minus agg 3" (13,750 sf)	t	2,200	5.25	4.80
Asph paving, 85-100 penet.	t	132	23.00	26.00
Paint 8 Armco bldgs & incinerator	ls	job	4,700	6,500
RC warehouse	ls	job	75,000	80,000
Curb & gutter, integr, constr	lf	175	3.00	3.50
Cross gutter, constr	sf	190	1.00	0.70
Clarifier	ls	job	5,000	3,000
Sewer lines, exterior	ls	job	5,800	4,500

Group F—Service Road	
1 Tomei Constr. Co., Van Nuys, Calif	$87,390
2 Ball & Simpson, Berkley, Calif	89,308
9C Griffith Co., Los Angeles, Calif	104,235
15 J. A. Thompson & Son, Inglewood, Calif	119,677

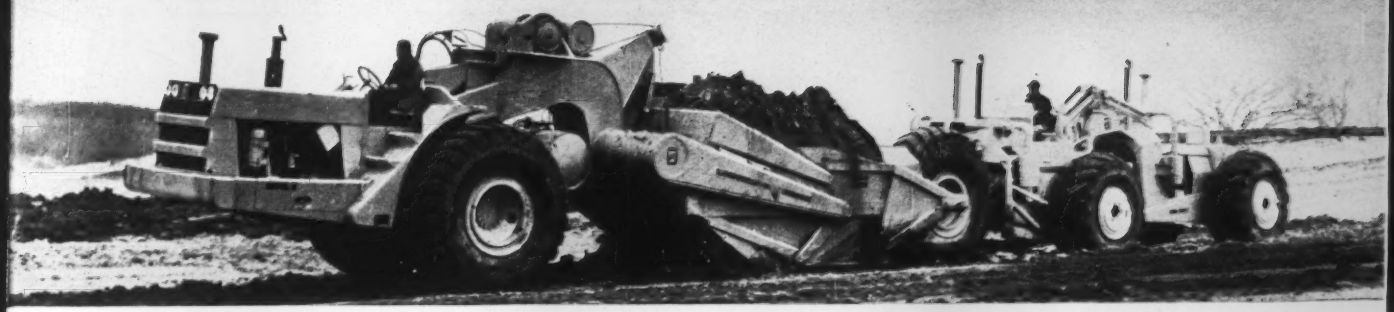
Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	9C
Excavation	cy	20,000	$0.50	$0.55
CMPA culv, 10 ga, 29"x18"	lf	400	13.00	14.00
CMP culv, 18"x14" ga	lf	900	6.50	7.00
Catch basin, st drain, remodel	ea	2	100.00	55.00
Head walls, tp A	ea	16	200.00	180.00
B, with apron	ea	2	450.00	550.00
Tack coat (32,600 sy)	t	34	50.00	55.00
Asph stab base, 5"	sy	34,600	0.55	1.20
Bit surf crse, minus agg 3", (32,600 sy)	t	5,170	7.00	4.50
Asph pavement, 85-100 penet	t	330	8.00	26.00
Seeding	ac	6	300.00	200.00
PCC ditch paving	sf	180	1.00	2.00
Highway center stripe	ls	job	500.00	450.00

Group G—Box Storm Drain for Power Line Easement	
1 Matich Constrs., Colton, Calif	$30,655
2C Griffith Co., Los Angeles, Calif	31,102
15 R. A. Westbrook & Morrison Knudsen Co., Sacramento, Calif	50,178

Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	2C
Excavation, struct	cy	700	$3.15	$1.90
Concrete, struct	cy	470	37.00	42.00
apron slab	cy	60	52.00	35.00
Steel, reinforcing	lb	50,000	0.15	0.15
Fence, chain link	lf	180	2.50	2.40

(Continued on p. 59)

27 cu. yds. heaped



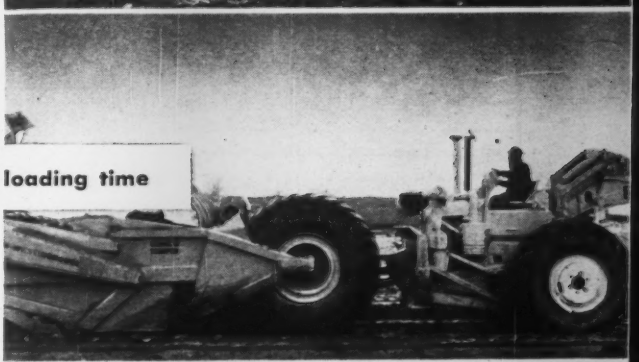
27-yard "B" gets capacity load of red clay in less than a minute, pushed by 420 hp LeTourneau-Westinghouse Twin-C* push-tractor.

More for your money with new easy-loading Fullpak* scraper and new Big B Tournapull®

Its ability to get big loads fast, its short-turn radius, its speed and maneuverability, its low center of gravity ... make this LeTourneau-Westinghouse machine a pace-setter on almost any length cycle. You'll find it a sure profit-maker on big-yardage jobs. Here are 3 good reasons why this new Big "B" (with Fullpak) gives you *more for your money:*

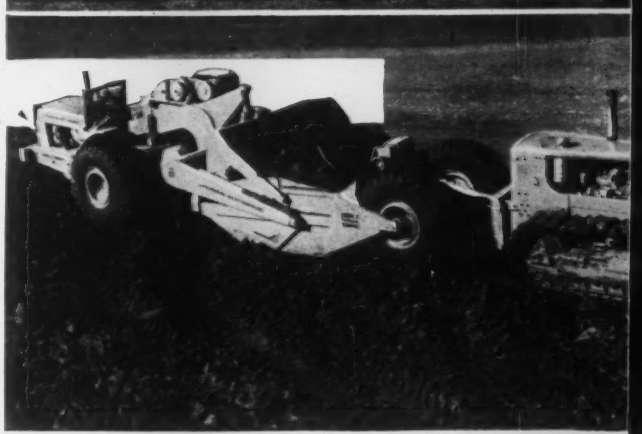
Low-and-wide Fullpak scraper produces more at lowest-net-cost-per-yard

This easy-loading LeTourneau-Westinghouse 27-yd. Fullpak scraper is the result of building more than 13,000 self-propelled scraper units over a period of more than 19 years. Its basic low-and-wide design has been thoroughly field-tested on hundreds of Model C Tournapulls with 18-yd. Fullpak scrapers on jobs all over the world. Using the same pusher in the same materials, the new 27-yd. B Fullpak gets heaped loads in approximately same time as most medium-size scrapers.



Direct-line thrust from pusher to cutting edge . . . cuts loading time

Large-size push-plate is positioned low, with angle of thrust in direct line with cutting edge of scraper bowl. There is no "humping action" of pusher or scraper. Direct-line thrust steadies scraper, keeps pusher on the ground, makes use of all push-power available. Scraper floor has a rise of only 1° when blade is on ground. Materials move in easily, with smallest possible resistance. This all adds up to easy loading ... faster loading ... bigger production.



More pay-yards with same pusher-power

B Tournapull, with 27-yd. Fullpak scraper, gives you more pay-yards with the same pusher used to load 20 to 25-yd. scrapers. Because of its easy-loading advantages, the Big "B" heaps in record time, without need for tandem pushers. This saves man hours and pusher costs ... another "plus" advantage.

In addition to the bigger capacity and fast-loading characteristics of this new "B", you get many mechanical improvements. The "B" gives you the exclusive L-W power-transfer differential; 90° turn-ability; multiple-disc air brakes; and choice of 300 hp GM, 300 hp Cummins or 335 hp Cummins engine with torque converter. Write or call us for complete information.

*Trademark BP-1537-DC-1

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

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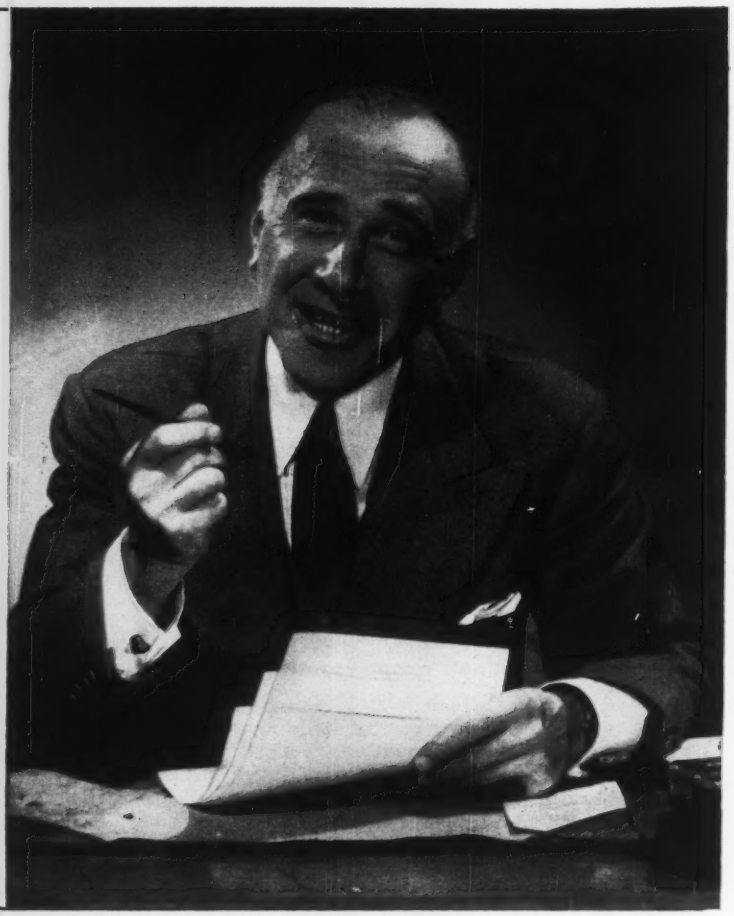

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I want to know how to get more new construction business. Please let me see some typical Dodge Reports for my area. I am interested in the markets checked below:

☐ House Construction ☐ General Building
☐ Engineering Projects (Heavy Construction)

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Name_____

Company_____

Address_____

City_____ Zone_____ State_____

Dodge Reports
For Timed Selling to the Construction Industry

Additive Alt #1—Local and International Plane Maintenance Sites

1	Matich Constrs., Colton, Calif	$194,953
2	S. A. Cummings, Compton, Calif	206,979
3C	Griffith Co., Los Angeles, Calif	207,085
15	R. R. Hensler, Sun Valley, Calif	272,296

Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	3C
Excavation	cy	9,500	$0.42	$0.54
RCP, 1750D, 18"	lf	850	8.40	8.70
21"	lf	724	11.00	11.00
24"	lf	288	11.50	12.00
CMP, 14 ga, 18"	lf	80	6.80	6.50
CMPA, 10 ga, 29"x18"	lf	200	13.50	14.00
Headwall tp A	ea	1	160.00	160.00
B, with apron	ea	1	840.00	500.00
Junction structure	ls	job	1,600	600.00
Catch basin, "A"	ea	6	260.00	575.00
VCP sewer pipe, 6"	lf	1,800	1.90	4.20
Std junction chamber "F"	ea	5	630.00	270.00
CI water line, cl 150, 8"	lf	2,490	5.25	5.20
Curb & gutter, remove	lf	50	1.05	2.20
construct	lf	101	2.10	2.20
Cross gutter, construct	sf	190	0.50	0.70
Fence, chain link, relocate	lf	100	1.05	0.70
new	lf	3,100	2.20	1.75
Gates, dbl drive, new	ea	2	200.00	160.00
PCC pavement, 9"	sy	17,780	3.70	3.90
12"	sy	11,860	4.54	5.00
Base crse, mixed-in-pl, 5"	sy	5,200	1.31	1.35
Shoulders, mixed-in-pl, 2½"	sy	5,425	0.84	0.85
Bituminous tack coats	t	5	105.00	60.00
surf crse, min agg, 3"	t	785	5.60	5.00
curb	lf	500	0.80	1.10
Asph, paving, 85-100 penet	t	45	23.00	26.00
Automatic controls for junction structure	ls	job	420.00	700.00
Dust palliative, MC-1	sy	1,350	0.03	0.04

Additive Alt. #2—Box Under East End of East-West Runway

1	Ball & Simpson, Berkeley, Calif	$56,360
2C	Griffith Co, Los Angeles, Calif	58,490
15	R. R. Hensler, Los Angeles, Calif	99,650

Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	2C
Ditch paving, remodel	ls	job	$250.00	$200.00
Excavation, struct	cy	900	1.50	1.00
Concrete, struct	cy	1,080	35.00	35.00
Steel, reinforcing	lb	119,000	0.13	0.15
Catch basin	ea	1	400.00	400.00
Cut-off wall	cy	6	65.00	90.00
Ditch paving	cy	20	35.00	40.00

Additive Alt. #3—Pave High-Speed Turn-offs

1	Peter Kiewit Sons Co., Calif	$64,376
2	Matich Constrs., Colton, Calif	66,940
3C	Griffith Co., Los Angeles, Calif	73,029
15	MacDonald & Kruse, Sun Valley, Calif	99,240

Bids: 11-13-57 Items	Unit	Quantity	Unit Prices 1	3C
Taxiway, PCC pavement, 12"	sy	14,160	$4.54	$5.15
marking	sf	1,500	0.06	0.07

Suspension Span to Canada Averages $102.50 per Sq Ft

This $5.7 million suspension bridge has a center span of 1150 ft and two side spans of 500 ft each. It crosses the St. Lawrence River between Ogdensburg, N. Y., and Grenville, Ont. Built for the New York State Department of Public Works, it will be operated by the Ogdensburg Bridge Authority, a New York State agency with corporate status in Canada. Modjeski & Masters, Harrisburg, Pa., are the design engineers, in association with P. L. Pratley, Montreal, Que. Robert W. Sweet is district engineer for the State at Watertown, N. Y.

The deck is 31 ft wide and carries a 26 ft open-grid steel roadway, a 3½ ft precast concrete sidewalk and a 1½ ft curb. Cost of the superstructure aver-

Architects: Weed, Russell, Johnson and Associates
Engineers: Norman Dignum and Associates
General Contractors: Arnold Construction Company

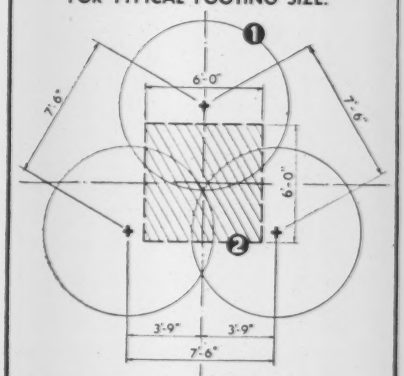
Vibroflotation®

was used to compact the sandy subsoil for foundations — eliminated the need for piling — at West Palm Beach, Fla.

Sears Town at West Palm Beach was built upon sand that was compacted by Vibroflotation. 541 compactions were made to a depth of 12 feet below bottom of footings. Vibroflotation provided a rapid, effective solution to the problem of eliminating possible future foundation settlement and in addition provided a substantial savings over alternate methods.

Write for booklet E-14

TRIPLE COMPACTION PATTERN USED FOR TYPICAL FOOTING SIZE.



✚ POINT OF VIBROFLOT PENETRATION

1 ANTICIPATED EXTENT OF 70% RELATIVE DENSITY OF EACH COMPACTION POINT

2 TYPICAL FOOTING SIZE

Proven Applications

Deep Foundations • Dams
Bridges • Airports • Tunnels
Commercial Foundations
Industrial Foundations

VIBROFLOTATION FOUNDATION CO.
930 Fort Duquesne Boulevard
Pittsburgh 22, Pa.
ATlantic 1-2500

V-14

ages $102.50 per sq ft of roadway.

Only U.S. labor will be used. Wages prevailing in the area include: Structural iron workers, $3.85; operating engineers, $3.375 both including fringe benefits.

The two bids are:

1C American Bridge Co. Div., U. S. Steel Corp., New York City $5,742,755
2 Bethlehem Steel Co., Bethlehem, Pa. 5,960,830

Bids: 11-21-57 Items	Unit	Quantity	Unit Prices 1C	2
Portland cement, tp 2	bbl	400	$7.10	$7.25
Concrete, cl 1A, struct	cy	250	115.00	185.00
Bar reinf for structures	lb	40,000	0.19	0.2015
Metalwork in towers, tower castings, cable bents, cable bent castings & anchorages	lb	2,750,000	0.4697	0.4660
cable bands, splay castings, high tensile bolts, anchor hood & bronze collars	lb	68,000	1.20	1.65
stiffening trusses & floor system	lb	5,600,000	0.3963	0.42
main cables & sockets	lb	1,310,000	0.856	0.85
suspender ropes, sockets, hand ropes & handrope supports	lb	160,000	1.37	1.35
Floor, open steel	sf	55,600	8.25	8.70
Wrapping cables	lf	5,100	34.40	38.50
Aluminum railing, incl lamposts	lf	4,300	31.70	34.50

Completion scheduled April 1, 1960

Miami Sewer

Skin divers to lay 7,000 linear ft. under water

This $463,133 contract to Intercounty Construction Co., Wilton Manor, Fla. is part of a $10 million sanitary sewer program. It is for the Central Negro trunk main and sewage pump station for Miami, Fla. Arthur E. Darlow is Director of the Department of Engineering.

Two existing pumping stations will be replaced by a new reinforced concrete station with three 900 gpm pumps to handle a maximum flow of 2.63 mgd.

The job is in an area of high population density, with one section in an alley in which working quarters are so close that a portable conveyor belt will be used to remove excavation.

Extra strength clay pipe ranging from 8 to 30 in. will be laid in cuts from 6 to 20 ft deep. Half of this 13,500 lin ft of sewer is under water, where it will be placed by divers using aqua lungs.

Class A concrete is specified 3,000 psi in 28 days. Cast iron pipe is 30 in., Class 150.

Materials can be transported by truck or rail.

Wages which will prevail on this job include: Carpenters, $3.05; cement finishers, $3.45; bulldozer operators, $1.75; pipe layers, $1.35; ditching machine operators, $1.50; truck drivers, $1.39; tile setters, $3.45; sheet metal workers, $3.35; common labor, $1.35; pump operator, $2.32; backhoe operators, $2.88; divers, $4.375.

(Continued on page 64)

boosts trench production 500%

SPRINGFIELD, N. J. contractors, Ern Construction Co., increased production more than 500% by replacing a backhoe with a Cleveland 110 on 11,000 feet of trenching for 8 and 12-inch pipe, digging 2 feet wide by 5½ feet deep.

"The 110 got us 780 feet of trench per hour where we had been getting only 100-150 feet with the backhoe," reports Ern Foreman Henry J. Appleby. "Our operator got top production with the Cleveland after only 5 days experience at the controls. He was one of our regular work crew and had no previous training as a trencher operator."

Ern also saved 25% on his repaving costs with the narrow, clean accurate trench produced by his Cleveland 110.

The CLEVELAND TRENCHER Co.

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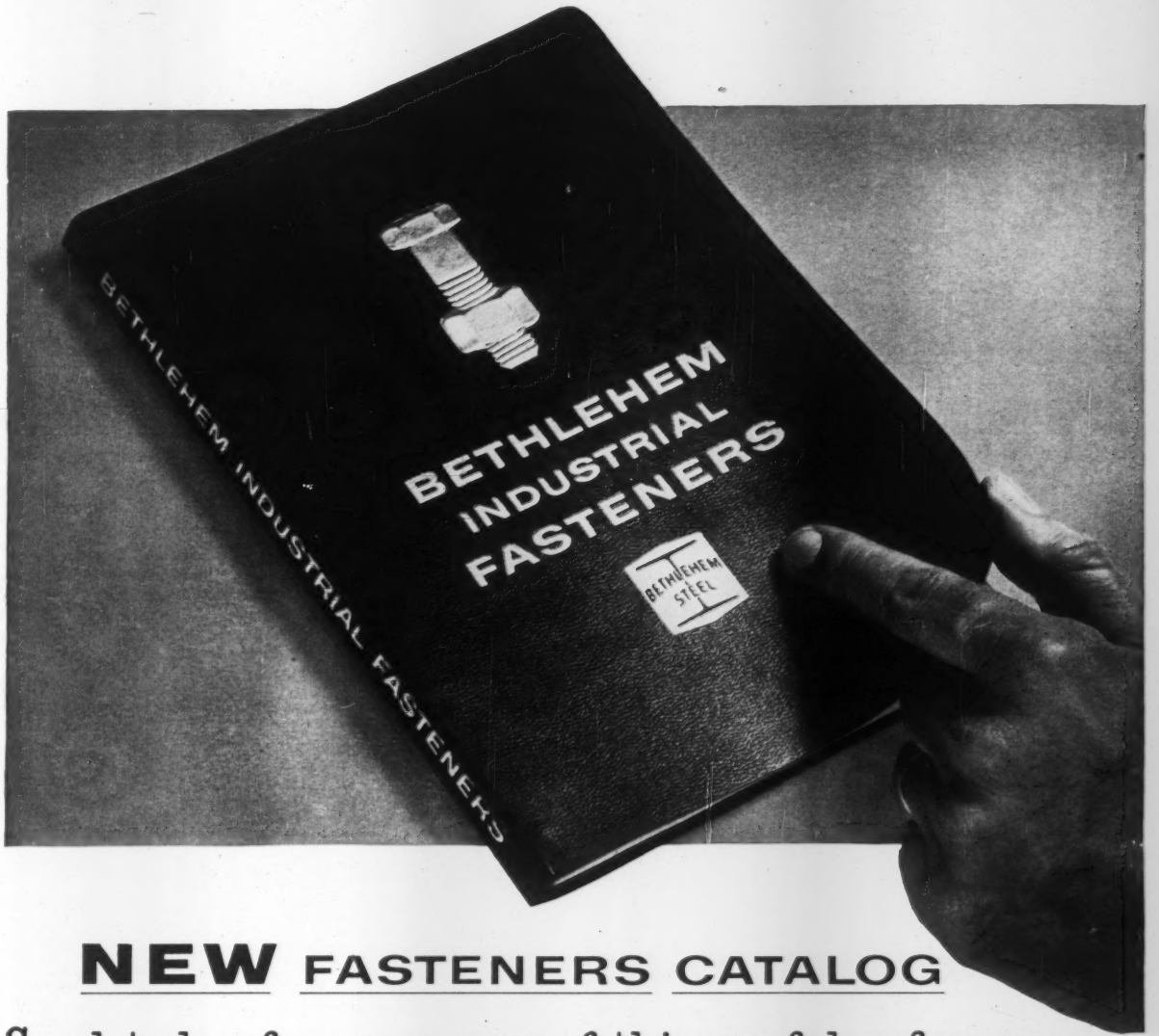
Good Everywhere ®



NEW FASTENERS CATALOG

Send today for your copy of this useful reference, the most complete edition ever issued!

Bethlehem has just issued "Industrial Fasteners," an illustrated catalog on headed and threaded fasteners. Handsomely bound, this 164-page catalog is attractively printed in two colors; and it is packed with data on just about every type and size of fastener imaginable. List prices, dimensions, weights, and container quantities are also included.

If you have not yet received your copy, use the accompanying coupon. Simply print your name and address, clip the coupon, and mail it direct to us at Bethlehem, Pa.

Publications Department, Room 1035
Bethlehem Steel Company
Bethlehem, Pa.

Gentlemen:
I would like to have a copy of "Industrial Fasteners," your new 164-page catalog (No. 436) on headed and threaded fastener items.

*Name*_____ *Title*_____

*Company*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

Vision-Vent installations such as this now can be specified with exclusive new Truscon Supercoat Finish to eliminate field painting. Pictured is Activities Building, Georgia Training School for Girls, Adamsville, Ga. John J. Harte, architect. Abco Builders, contractor.

New...Truscon Vision-Vent Window Walls with Sensational Supercoat Finish

Now, you can get the solid strength of steel for curtain walls and windows and save field painting costs, too. New Truscon Supercoat Process is factory-applied to eliminate all field painting . . . both at installation and during the years.

This outstanding Truscon development has been thoroughly laboratory tested—for weather, atmosphere, time, and abuse. It has successfully met each challenge.

Vision-Vent brings you all the mass-production and installation economies of standard steel windows. It's an insulated wall section, complete with window. It goes up fast.

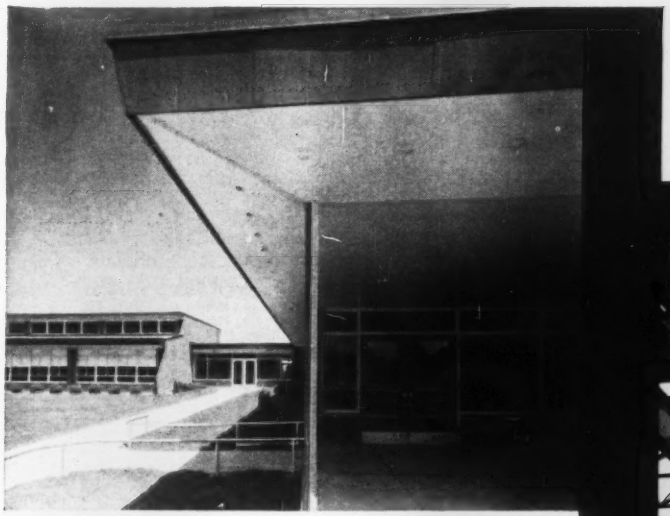
With Truscon Supercoat and Vision-Vent Window Walls, there is no need to sacrifice strength and solidity in walls and windows simply to avoid painting. Supercoat Process can be furnished now on specification for all Vision-Vent types . . . as well as in factory shipment on all Truscon Steel Windows for commercial, institutional, and industrial construction. Choice of seven colors.

See Sweet's (17b/Tr) or send coupon for Supercoat booklet. Supercoat sample on request.

Install without painting!

Stave off maintenance painting!

7 Colors!



NOW . . . TRUSCON CERTIFIES EVERY "O-T" STEEL JOIST. For your protection, Truscon now offers you, upon request, written certification that the "O-T" Steel Joists you specify are manufactured in accordance with the standards of the Steel Joist Institute and are fully qualified to bear the SJI Seal of Approval.

This certification covers each building for which the joists are engineered. It is further assurance of predictable, dependable load-bearing. No extra cost for this protection. Send coupon for facts.

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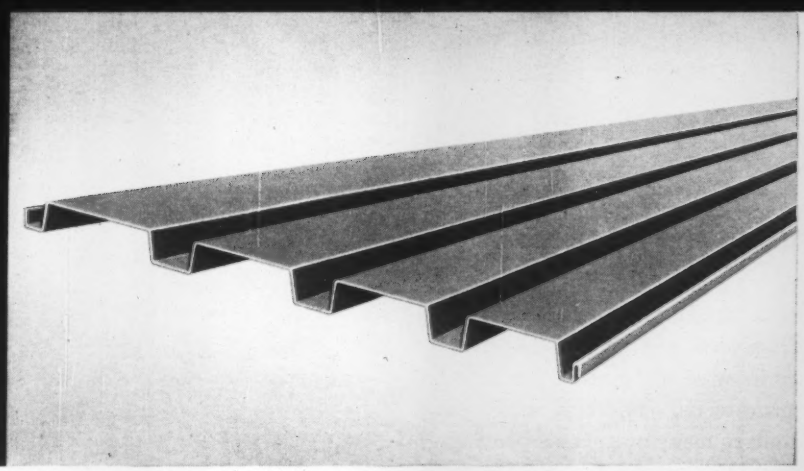

SPEED COMPLETION WITH 24-INCH FERROBORD® STEEL ROOFDECK. New, wider Truscon Ferrobord is available in lengths up to 32 feet, 6 inches. It roofs large areas quickly. Straight lay means that several crews can roof without delay. All work is done from above—Ferrobord is quickly welded to top chords of joists or purlins. Ferrobord is light, strong, fire-resistant. Available now. Send coupon for specs.

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Please send ☐ Supercoat Sample • Literature describing ☐ Truscon Supercoat ☐ Truscon Vision-Vent Window Walls ☐ Truscon "O-T" Steel Joists ☐ Ferrobord Steel Roofdeck ☐ ELECTRUNITE square tubing

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These forms tied in 5 minutes by two men... in less than 10 minutes by one man.

Stripped in moments by one man. No form clamps to move.

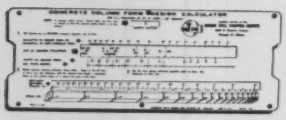
Stripped form is smooth, no bulge. Saves finishing time.

Concrete column forms tied in 5 minutes with Signode steel strapping

The Signode way reduces costs by as much as 33% in strapping forms for concrete columns and bridge piers. On this job, the forms for each floor were built in a central location, strapped in 5 minutes each, and lowered to the floor below over the reinforcing rods.

You can use the strapping and tools in many other money-saving ways... to reinforce scaffolding and to bundle materials, for example. The Signode man near you can save you time in getting started quickly with the right tools and strapping. Call him today or write.

Calculator simplifies concrete column form design



Your guide to proven, economical designs for concrete column forms. Shows strap sizes and spacings to use on forms up to 65" diagonal or diameter... illustrates six tested truss designs. Offer limited to architects, contractors, engineers. Mailed promptly on receipt of $1.00.

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. . . Unit Prices

A job in Coral Gables is reported in the June 9, 1955 issue of ENR, p. 41. (Skindivers Beat Tough Pipelaying Job.)

One of five bids, the low was 23% below the engineer's estimate, 7.4% below the second bid, and 30.9% below the high. These include:

1C	Intercounty Constr. Co., Wilton Manor, Fla	$463,133
2	Joe Reinertson of Miami, Inc, Miami, Fla	489,944
5	Rood Constr. Co., Miami, Fla	670,393
EE	Arthur E. Darlow, Director, Dept of Engineering, City of Miami, Fla	600,000

Bids: 12-18-57 Items	Unit	Quantity	Unit Prices 1C	2
VSP, ES, 8", 0/6' cut	lf	20	$5.00	$8.00
6/8'	lf	185	5.50	8.00
8/10'	lf	40	25.00	8.00
10" 0/10'	lf	60	7.00	10.00
10/12'	lf	1,290	8.00	10.00
12" 0/12'	lf	170	9.00	15.00
12/14'	lf	190	10.50	15.50
16/18'	lf	5	20.00	16.00
15" 0/12'	lf	55	12.50	12.00
12/14'	lf	385	13.50	15.75
14/16'	lf	160	14.00	18.00
18" 0/8'	lf	10	12.00	15.00
8/10'	lf	370	14.00	17.15
10/12'	lf	1,395	15.00	18.80
12/14'	lf	2,860	20.00	22.15
14/16'	lf	475	22.00	26.50
16/18'	lf	290	24.00	29.00
18/20'	lf	243	28.00	36.00
24" 0/12'	lf	180	17.00	19.00
12/14'	lf	150	22.00	20.00
14/16'	lf	330	24.00	22.00
16/18'	lf	420	26.00	25.00
18/20'	lf	240	30.00	32.00
27" 0/18'	lf	1,090	33.00	35.00
18/20'	lf	380	40.00	37.00
Ctd con: cr ES VSP, 30" 0/14'	lf	290	17.00	30.00
14/16'	lf	405	22.00	34.00
16/18'	lf	2,115	28.00	36.00
Manholes, tp A, 4' 6'	ea	3	225.00	200.00
6/8'	ea	1	250.00	250.00
8/10'	ea	4	320.00	325.00
10/12'	ea	11	375.00	425.00
12/14'	ea	16	450.00	485.00
14/16'	ea	5	500.00	545.00
16/18'	ea	16	700.00	625.00
18/20'	ea	8	900.00	725.00
spec <15	ea	1	400.00	800.00
Pump station	ls	job	75,000	67,500
Drop conn at manhole	lf	170	10.00	40.00
Cut for 30" or less pipe 0/2" cut	lf	500	0.01	0.10
2/4"	lf	300	0.02	0.15
4/6"	lf	100	0.03	0.20
Extra backfill	cy	750	0.25	0.50
Rock bed	cy	700	5.00	6.50
Pavement, perm, replace	sy	6,000	3.50	3.25
sand/oil, replace	sy	1,500	2.50	2.25
Conc sidewalk, 4", replace	sf	100	0.70	0.75
6", replace	sf	100	0.85	0.85
curb, 6", replace	lf	10	3.00	2.00
Pump stations, 2 existing, abandon & remove equipment	ls	job	1,500	3,000
Protective slab	sy	30	8.00	9.00
Bracing & shoring in place	sf	10,000	0.10	0.10
Test holes	ea	10	100.00	50.00
CIP, cl 150, 30"	lf	150	115.00	65.00
Cash allowance	ls	job	6,000	6,000
Work performed by FEL RR	ls	job	5,000	5,000
Ext strm sewers & MHs, relocate	ls	job	1,900	nb
Allowance for use of police	ls	job	2,000	2,000

Commence: 2-1-58 Complete: 11-1-58

Railroad Relocation for New Jersey Reservoir

Over half of the work to relocate this three-mile stretch of single-track mainline of the Wharton & Northern RR in Morris County will be on a steep heavily wooded hillside, difficult of access. It replaces track that will be flooded by the proposed Charlotteburg Reservoir for the Newark, N. J. water supply.

Parsons, Brinckerhoff, Hall & MacDonald, New York are the consultants, G. Gale Dixon associate, Water Supply and Sewage Dept. George W. Andress

CUT

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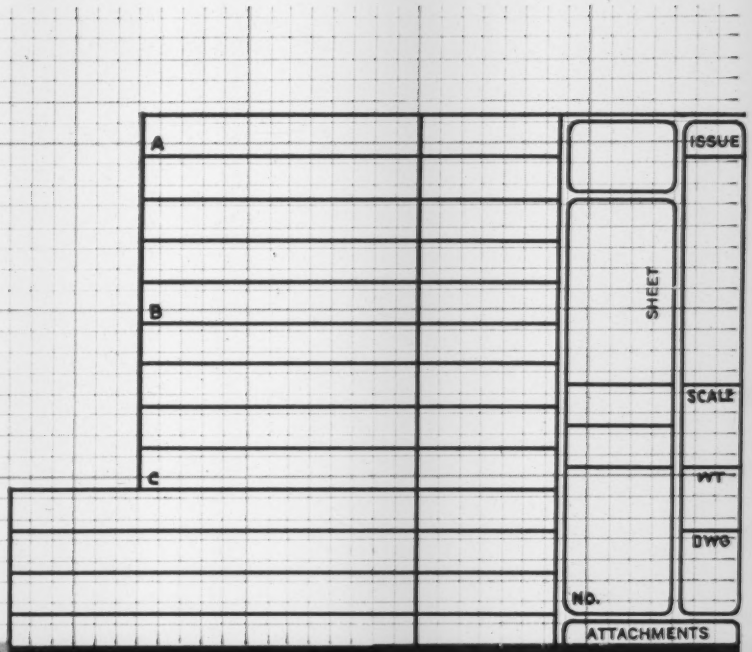

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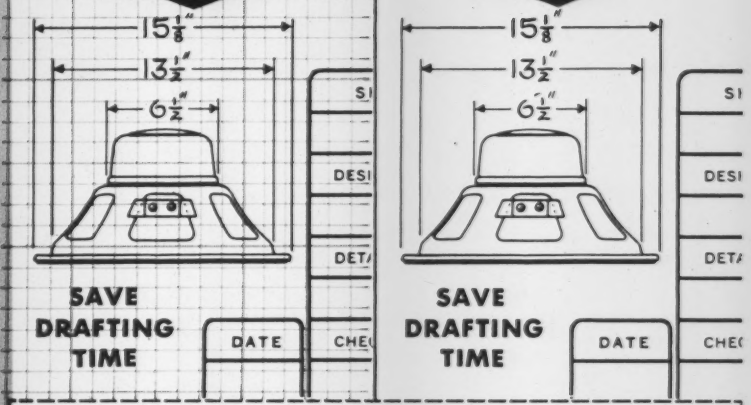

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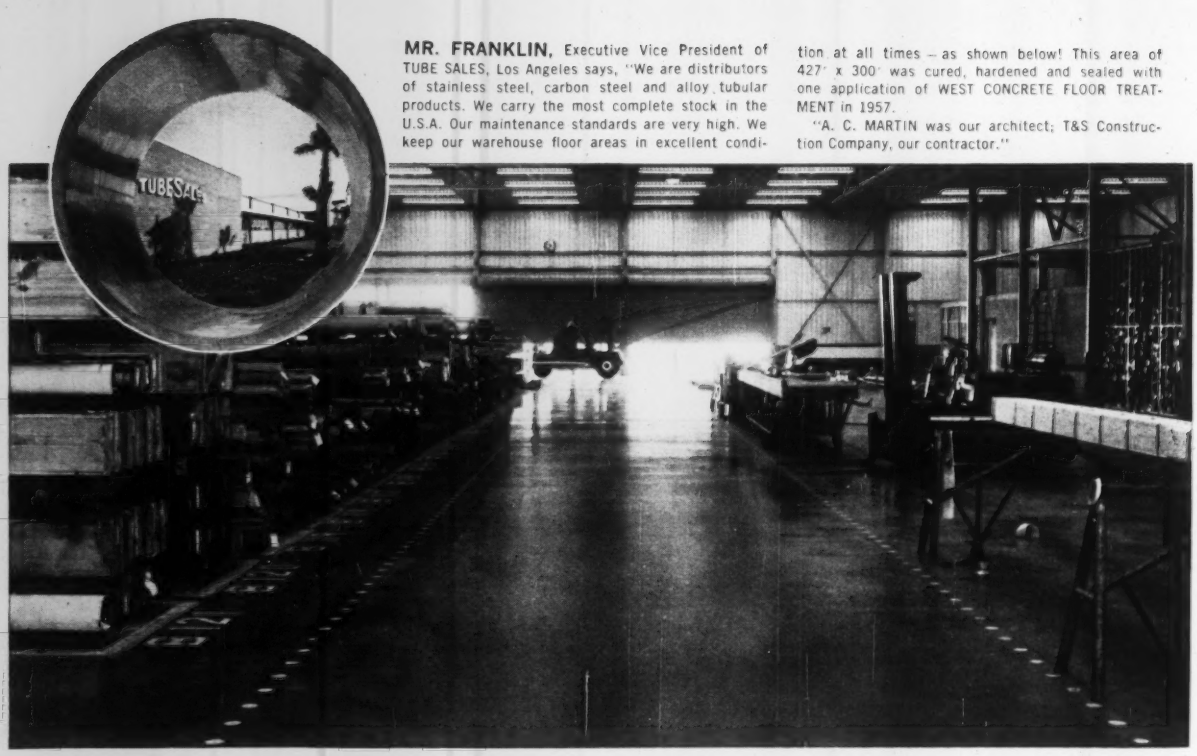

MR. FRANKLIN, Executive Vice President of TUBE SALES, Los Angeles says, "We are distributors of stainless steel, carbon steel and alloy tubular products. We carry the most complete stock in the U.S.A. Our maintenance standards are very high. We keep our warehouse floor areas in excellent condition at all times – as shown below! This area of 427' x 300' was cured, hardened and sealed with one application of WEST CONCRETE FLOOR TREATMENT in 1957.

"A. C. MARTIN was our architect; T&S Construction Company, our contractor."

ONE APPLICATION OF ONE CONCRETE FLOOR TREATMENT

CURES · HARDENS · SEALS CONCRETE SURFACE

WEST Concrete Floor Treatment is a proven time-saving, labor-saving product that 1) Cures 2) Hardens 3) Seals newly-laid concrete surfaces with *one* application. It is a rubber based formulation with a quick drying solvent. Formerly as many as three separate products and applications were needed to obtain the same results.

WEST Concrete Floor Treatment can be applied immediately after horizontal surfaces have been troweled or as soon as the concrete can be walked on. Usually in *one* to *eight* hours. It is applied quickly and easily with a lamb's wool applicator or standard hand pump sprayer. All the labor formerly required for cleaning the concrete surface after delayed concrete drying, and between the use of as many as three separate products and applications is eliminated.

WEST Concrete Floor Treatment is applied immediately after troweling. Its fast drying permits subsequent building operations to be speeded. It also dustproofs as it seals. This speeds the final cleaning. All foreign matter is easily flushed off the surface.

WEST Concrete Floor Treatment enables newly-laid, wet concrete to retain 95% of its moisture. This permits it to cure and harden while sealing the surface against acids, oils, greases and other foreign matter. This incongruous aspect of holding back most of the moisture while permitting some moisture to escape slowly is the key to this product's amazing success.

WEST Concrete Floor Treatment is colorless and will not alter the color of the poured mix. It goes on evenly and spreads quickly without streaks. One gallon covers from 300-350 sq. ft.

WEST Concrete Floor Treatment is fully attested, fully proven across the United States and Canada. Full details and samples are available immediately from any of WEST's 400 specially trained representatives from coast to coast. Write, phone or wire your nearest WEST office.

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DENVER, COLO.
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DETROIT, MICH.
FT. WORTH, TEXAS
FRESNO, CALIF.
HARTFORD, CONN.
HOUSTON, TEXAS
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VANCOUVER, B. C.
WINNIPEG, MAN.

is director of the Dept. of Public Works, Newark, and A. J. Simpson is division engineer, Div. of Water Supply.

Alternate bids on new and second-hand switches, rails, tie plates and splice bars produced the unusual result of a lower price on the new than on the second-hand materials.

The $589,860 award to Elmhurst Contracting Co., Inc., Corona, N. Y. is on the first of the alternates, using all new materials. This is $2,100 below their bid using second hand materials, and 15.7% below the engineers' estimate.

The contract includes replacement of a bridge carrying the New York, Susquehanna & Western RR over the Pequannock River south of Newfoundland, N. J., and construction of 1.5 miles of track for an interchange yard between that railroad and the Wharton & Northern RR.

Concrete is ACI Recommended Practice (ACI 613-54).

Wages prevailing on this job range from $4.10 for skilled, through $2.70 for common labor.

There were nine bids, but one was informal. The other eight included:

1AC	Elmhurst Contracting Co., Corona, N. Y.	$589,860
2A	The Forest Company, Wharton, N. J.	624,152
8	Construction Service Co., Bound Brook, N. J.	763,758
1B	Elmhurst Contracting Co., Corona, N. Y.	591,960
2B	The Forest Company, Wharton, N. J.	625,874
8	Construction Service Co., Bound Brook, N. J.	761,158

Bids: 11-4-58 Items	Unit	Quantity	Unit Prices 1C	2
Clear & grub	ls	job	$35,000	$37,800
Excavation, earth	cy	48,000	1 00	2 10
rock	cy	30,000	3 00	3 60
Borrow	cy	1,000	1 20	2 50
Timber sht & brace, lip	Mfbm	30	100 00	100 00
Track,				
alt A new materials	lf	18,000	16 00C	13 37
B secondhand matl	lf	18,000	16 25	13 57
Crossover, #10				
alt A new materials	ls	job	5,500C	6,182
B secondhand matl	ls	job	4,500	5,774
Turnout #8				
alt A new materials	ea	3	5,000C	4,951
B secondhand matl	ea	3	4,500	4,555
Turnout #6				
alt A new materials	ea	1	4,000C	4,461
B secondhand matl	ea	1	4,100	4,119
Bumper	ea	1	300 00	311 00
Derail	ea	1	200 00	100 00
Mile post	ea	3	20 00	12 00
Road crossing	ls	job	600 00	750 00
Conc masonry	cy	150	60 00	100 00
Steel, reinforcing	lb	26,000	0 20	0 20
RR bridge, construct	ls	job	33,000	26,752
RCCP, 18" ϕ	lf	400	5 50	9 00
24"	lf	160	9 00	12 00
30"	lf	100	13 00	17 00
48"	lf	220	28 00	35 00
84"	lf	260	75 00	110 00
Paving, stone block	sy	2,000	5 50	4 00
grav base	cy	450	6 00	5 50
Cover crop seeding	sy	35,000	0 20	0 10
Railing for box culvert	ls	job	500 00	252 00

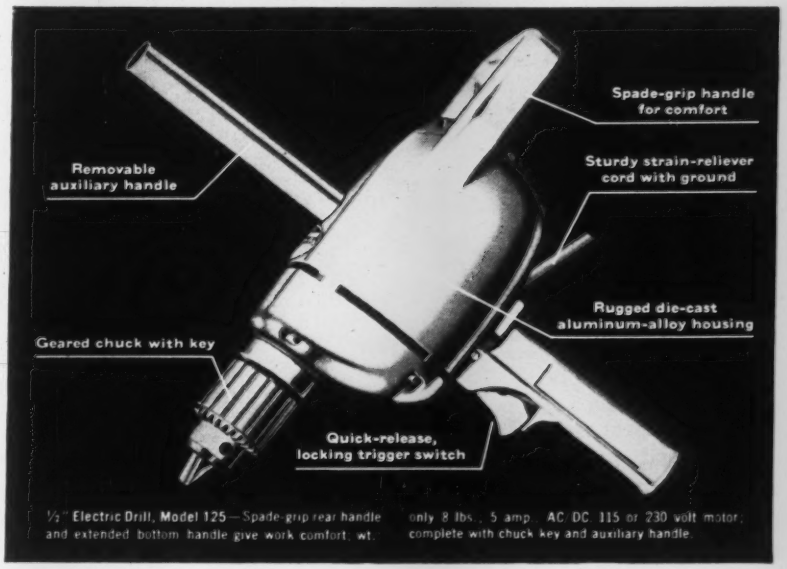
Completion schedule: 175 working days.
Liquidated damages: $200/day

Kansas City Expressway Features High Embankment

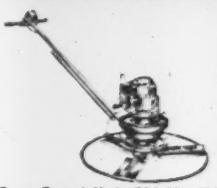
The 412,000 cu yd of earthwork compaction at 7¢ a cu yd and embankment at 60¢ a cu yd take over 83% of a $332,051 contract on the Kansas City

(Continued on p. 68)

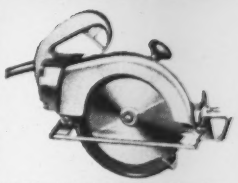
POWER to boost job efficiency with REMINGTON tools


Spade-grip handle for comfort
Removable auxiliary handle
Sturdy strain-reliever cord with ground
Rugged die-cast aluminum-alloy housing
Geared chuck with key
Quick-release, locking trigger switch

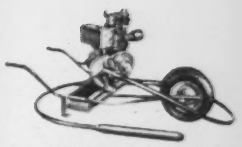
½" Electric Drill, Model 125—Spade-grip rear handle and extended bottom handle give work comfort; wt. only 8 lbs., 5 amp., AC/DC 115 or 230 volt motor; complete with chuck key and auxiliary handle.



Power Trowel, Model TG4-26—2½-hp. 4-cycle, gasoline-powered engine; 26"ring size; automatic recoil starter; centrifugal clutch disengages at idle.

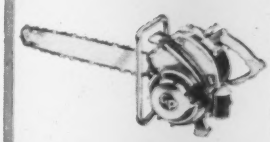


10" Electric Saw, Model 106—Rugged 13-amp. 115 or 230-volt AC/DC motor; cuts full 3⅜". Complete with blade, wrench and carrying case.



Concrete Vibrator, Model 7GV—A 5-hp. gasoline-powered unit from the industry's broadest line of air, electric and gasoline-driven models.

Powerful, rugged, easy to handle—Remington Power Tools help you boost output and ease the tough jobs. They're precision-built for long service and minimum maintenance. Your Remington distributor stocks and services the industry's widest selection of power tools and parts.



Golden "Logmaster" Chain Saw, 5-hp. Roller-Bearing nose boosts chain power up to 20%. Outcuts and outlasts other chain saws in its class.

Submersible Pump, Model PSP-602 with powerful air motor—completely submersible; pumps 14,000 gallons per hour against 10-ft. head.

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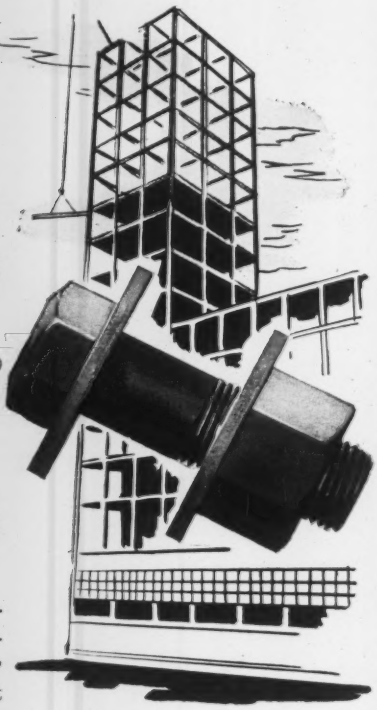
Heat-Treated WASHERS



● This fact is worth remembering and *repeating: No high-strength bolt assembly is any better than its washers* . . . just as no chain is any better than its weakest link. And there IS a difference in washers.

There's a difference in the basic quality of the steel used in making washers. There's a difference in heat treating . . . for better or for worse. There's a difference in the actual fabrication of washers . . . whether they come through uniformly *flat* and *true* or "slightly bent."

MIL-CARB Heat-Treated Washers, identified by a single nubbin on the outer edge, are fabricated from special soundness steel, selected for high tensile strength and special affinity for heat treating to conform to the rigid specifications applying to nuts, bolts and washers (ASTM A-325).

In terms of service, MIL-CARB Heat-Treated Washers resist galling even under maximum torquing of the nut. They rest clean and flat between nut and steel and help to provide a permanently tight, strong joint. Milwaukee Wrot Washer quality control assures you of a uniformly high quality product . . . at no cost penalty.

It pays to specify MIL-CARB Heat-Treated Washers for your jobs.

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WROUGHT WASHER MANUFACTURING CO.

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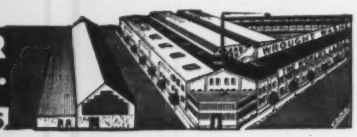


. . . Unit Prices

Expressway for Kansas City, Kansas. The award to R. G. Aldridge Construction Co., Kansas City, Kansas, was 8.3% below the engineers' estimate. Howard, Needles, Tammen & Bergendoff, Kansas City, Mo. are the consultants.

Work includes 0.57 mi of grading and drainage, removal of structures and maintenance of a detour, and construction of an embankment that averages 20 ft in height.

Borrow for the embankment may be taken from within the Kansas River Harbor or from borrow pits furnished by the contractor and approved by the engineer.

The contractor must provide and maintain his own haul roads and furnish all necessary flagmen and other protection for traffic, both pedestrian and property.

Specifications require 1.50 bbl of cement per cu yd.

Minimum wages on the job will range from a high of $2.80 for skilled labor, through $2.30 for semi-skilled and $1.90 for common laborers.

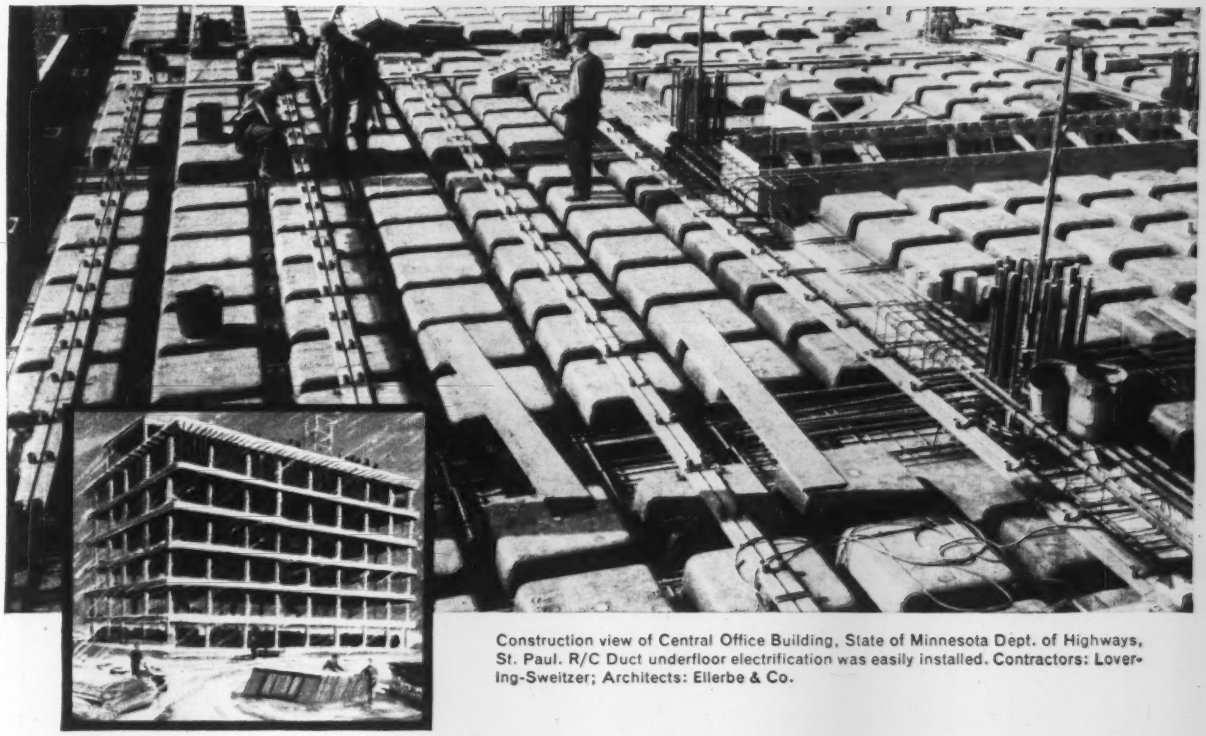
1C R. G. Aldridge, Kansas City, Kans. $332,051
2 Clarkson Constr. Co., Kansas City, Mo. 376,627
7 Storms-Green Constr. Co., Kansas City, Mo. 578,451
EE Howard Needles, Tammen & Bergendoff, Topeka, Kans 362,020

Bids: 10-24-57 Items	Unit	Quantity	Unit Prices 1C	2
Permanent barricades	lf	25	$5.00	$7.50
Excavation, common	cy	1,000	0.40	1.00
rock	cy	200	2.00	4.50
Existing structs, remove	ea	1	4,000	8,000
Embankment	cy	412,000	0.60	0.70
Compaction of earthwork	cy	412,000	0.07	0.07
subgrades in cuts	cy	200	0.25	0.30
Water	Mgal	4,120	2.00	2.00
Detour, construct	ls	job	1,000	2,100
maintain	mo	4	250.00	112.50
Agg for subgrade modif	t	130	2.00	2.75
binder base crse (AB-3)	t	1,600	2.00	2.10
surface crse	t	1,500	5.00	6.05
Manipulation for subgrade modif, cl B	sta	4.1	50.00	22.00
of base, AB-3	t	1,600	0.75	0.70
cover material	sta	4.1	20.00	11.00
Water, AB-3 base	Mgal	11	3.00	2.20
Cover material, CM-6	t	14	6.50	6.60
Asph, cutback, prime, MC-1	gal	1,630	0.15	0.16
tack, RC-1	gal	460	0.16	0.16
seal, RC-4	gal	190	0.20	0.16
cement, AC-4	gal	28,000	0.11	0.13
CMP, 14 ga, 18"	lf	254	6.00	6.75
24"	lf	247	7.25	8.50
12 ga, 24"	lf	240	9.60	10.50
Culv pipe, metal arch, 14 ga 22"x13"	lf	141	6.50	11.00
29"x18"	lf	70	8.50	17.75
18" RC	lf	80	5.00	7.15
36" RC	lf	106	12.50	13.75
Sewer pipe, 30" RC	lf	267	10.50	10.50
Metal end sections, 18"	ea	2	10.00	15.00
Concrete ditch lining	sy	50	6.00	8.40
Sodding	sy	900	0.60	0.55
Inlet box, drop, 4'x4'	ea	7	300.00	360.00
Manhole, standard, 4' dia	ea	7	650.00	335.00
Additional insurance	ls	job	5,000	200.00

Commence: 11-4-57. Complete: 6-7-58
Liquidated damages: $500 cal day

Know-How on Dumped Rip Rap Wins Contract

The call for alternate bids on embankment paving on Akron's Bridge Creek Dam produced a low of $5.95 per cu yd for 36 in. dumped stone rip rap. This took the contract for Acme Construction Co., Solon, Ohio, from competing bids on this alternate rang-



Construction view of Central Office Building, State of Minnesota Dept. of Highways, St. Paul. R/C Duct underfloor electrification was easily installed. Contractors: Lovering-Sweitzer; Architects: Ellerbe & Co.

NEITHER RAIN, NOR SLEET, NOR SNOW...

can stop Ceco Steeldome construction

Every engineer and contractor faces interruptions in the building time-table. But you can avoid undue delays caused by weather when you build with Ceco Steeldomes. For they are impervious to the elements . . . never get soggy, limp or distorted. Since Steeldomes are rigid, you can accurately pre-determine concrete quantities, and be assured of a high quality finish, too. Another advantage—it costs less to place rebars on a rigid Steeldome deck. And after the pour has cured, Steeldomes are easily removed. There is no costly clean-up. To speed building, to save material and labor . . . use Ceco Steeldomes—the best way to form two-way dome construction. Ceco Steel Products Corporation—general offices: 5601 West 26th Street, Chicago 50, Illinois. Offices, warehouses and fabricating plants in principal cities.

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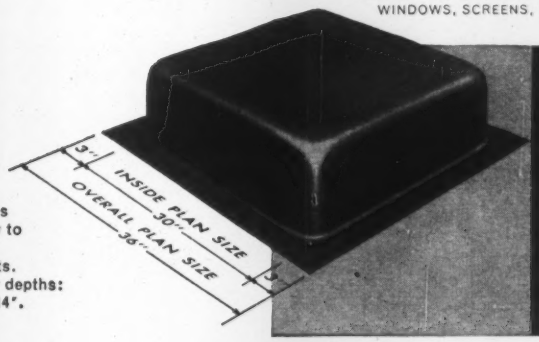
IN CONSTRUCTION PRODUCTS CECO ENGINEERING MAKES THE BIG DIFFERENCE

STEELFORMS / CONCRETE REINFORCING / STEEL JOISTS / METAL ROOF DECK / WINDOWS, SCREENS, DOORS / CECOFRAME BUILDINGS / METAL LATH



Ceco Steeldomes provide flexibility to meet span and load requirements. Available in four depths: 8", 10", 12" and 14".

CECO STEEL PRODUCTS CORPORATION
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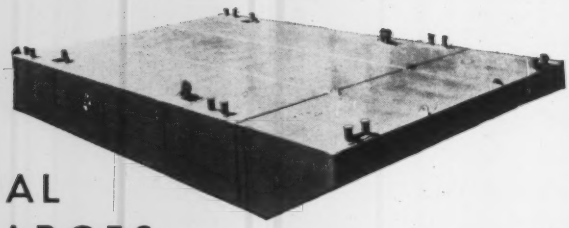
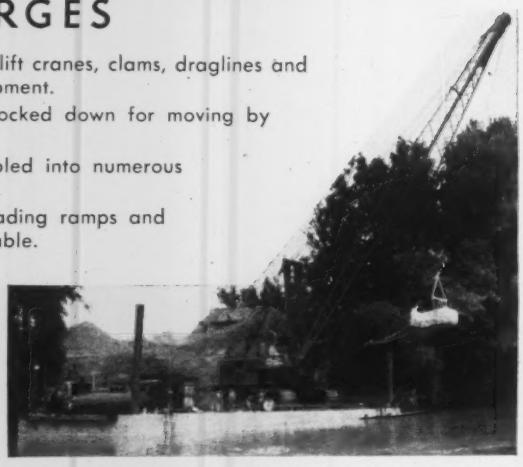
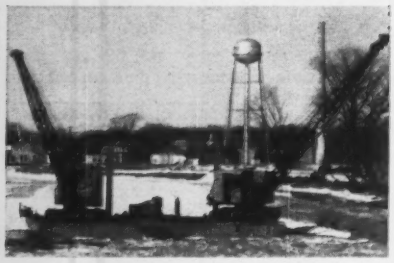


SECTIONAL BARGES

- For floating all sizes of lift cranes, clams, draglines and other contractors' equipment.
- Easily assembled or knocked down for moving by rail or highway.
- Sections can be assembled into numerous barge sizes.
- Spuds, deck fittings, loading ramps and other accessories available.



Photographs illustrating a few of the many successful operations using Manitowoc Sectional Barges. Economy and flexibility are outstanding features.



PORTA-FLOATS

• THE FLOAT WITH A 1000 USES •

The Manitowoc Porta-Float is the smaller version of the sectional barge. The standard basic float is 32' x 8' x 4'. Units can be pinned together to make a wide variety of sizes and arrangements. Economical and versatile for floating all types of contractors' equipment. Ideal for floating docks, piers, etc. Porta-Floats are easily transported on trucks as illustrated below.

PORTA-FLOATS & SECTIONAL BARGES *MANUFACTURED BY*

MANITOWOC SHIPBUILDING INC.

MANITOWOC, WISCONSIN

Please write for additional information and prices.

Sold direct or through Manitowoc Engineering Corporation distributors.

ing from $9.00 to $43.20 per cu yd. Lowest price on hand placed 18 in. stone was $6.40 per sq yd and on 8 in. concrete slope paving, $24 per cu yd. In total dollars, the three lowest alternates accounted for $223,720 for the dumped stone rip rap on a $1,617,974 contract, $240,000 for 18 in. hand placed stone paving on a $1,803,247 bid, and $210,000 for the 8 in. concrete on a $1,725,450 bid.

Acme's operating base is 20 miles from the site. Local knowledge and thorough preliminary investigations turned up the stone supply that gave them the big lead on the rip rap alternate. Their low bid was 26.8% below the engineer's estimate.

This $1.6 million earthfill dam, part of Akron's Cayuga River water supply, is 4,800 ft long and has a maximum height of 40 ft. The spillway is 200 ft long with chute and stilling basin. The outlet tower is 15x22x40 ft high, with a 7x11x135 ft long concrete conduit through the dam. Controlled discharge is to the existing stream bed. Parsons, Brinckerhoff, Hall & MacDonald, New York, are the engineers. Leo G. Walter is director of public works, Akron, and W. R. LaDue is superintendent and chief engineer of the water department.

The contractor supplies all the materials. Suitable fill for the earth dam is available on adjacent higher ground.

Structural concrete is 3,500 psi, with minimum cement content of 1.5 bbl per cu yd.

Wages paid on this job include: Tractor operators, $3.49; shovel and crane operators, $3.74; concrete workers, $2.915; carpenters, $3.655; common labor, $2.915.

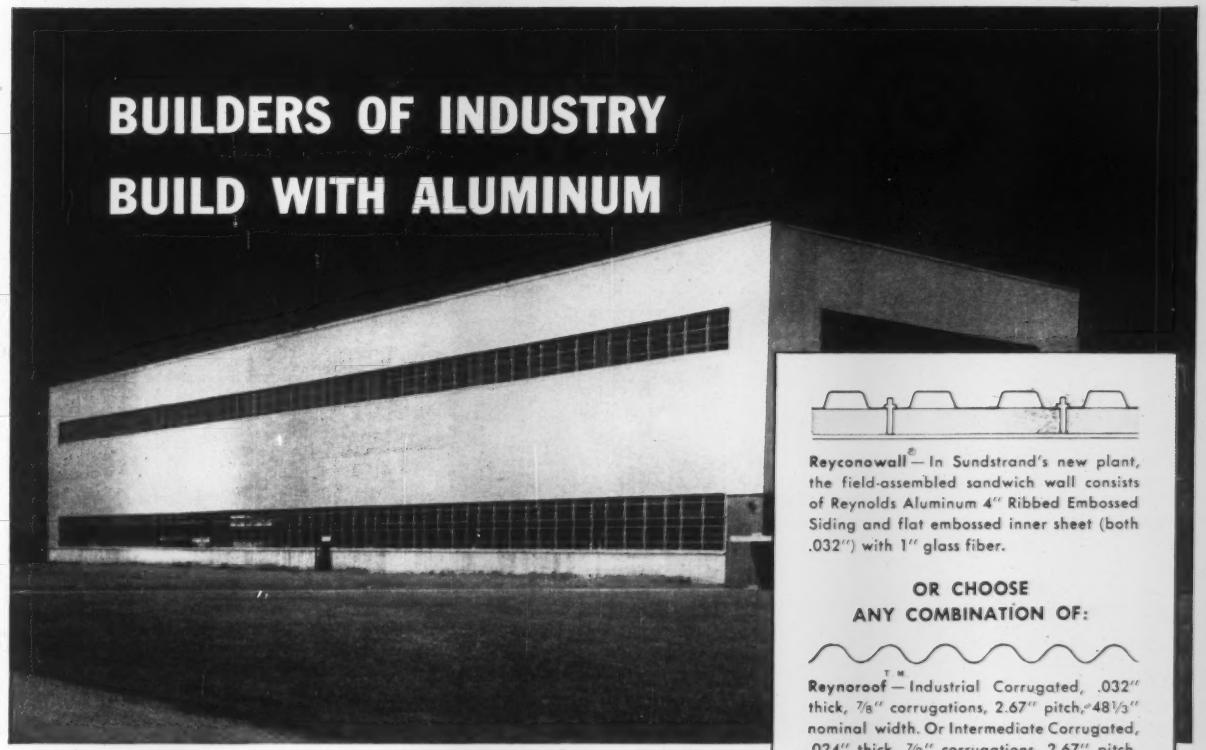
The bidding on this project went like this:

1AC	Acme Constr. Co., Solon, Ohio	$1,617,974
1B		1,621,754
1base	S. J. Groves & Sons Co., Minneapolis, Minn	1,803,247
2B	Robt. B. Ritter, Wharton, N. J	1,703,378
2A	Hunkin-Conkey Constr. Co., Cleveland, Ohio	1,910,532
2base	Robt. B. Ritter, Wharton, N. J	2,067,128
11A	E. J. Albrecht Co., Chicago, Ill	4,631,510
11base		4,769,690
12B		3,427,190
EEB	Parsons, Brinckerhoff, Hall & Mac-	2,051,000
EEbase	Donald, New York City	2,207,850
EEA		2,208,885

Bids: 12-2-57 Items	Unit	Quantity	Unit Prices 1C	1 base
Water diversion dur constr.	ls	job	$16,240	$25,200
Clearing	ac	85	200.00	250.00
Grubbing	ac	35	50.00	300.00
Stripping	cy	45,000	0.77	0.50
Excavation, struct	cy	57,000	0.57	0.85
channel	cy	68,000	0.47	0.75
trench	cy	1,400	2.50	1.50
borrow	cy	440,000	0.47	0.45
wasted	cy	60,000	0.43	0.20
Embankment, rolled, cl A	cy	290,000	0.14	0.20
B	cy	112,000	0.10	0.40
Compaction, add, roll	100sf	1,000,000	0.01	0.01
Auger borings	lf	1,800	1.50	1.00
Sand drain & filter mat.	cy	24,000	3.75	3.25
Screened grav backing & filter material	cy	20,000	4.95	6.50

(Continued on page 72)

For Lowest Upkeep, Long Life, High Efficiency...



Reyconowall® — In Sundstrand's new plant, the field-assembled sandwich wall consists of Reynolds Aluminum 4" Ribbed Embossed Siding and flat embossed inner sheet (both .032") with 1" glass fiber.

OR CHOOSE ANY COMBINATION OF:

Reynoroof™ — Industrial Corrugated, .032" thick, 7/8" corrugations, 2.67" pitch, 48⅓" nominal width. Or Intermediate Corrugated, .024" thick, 7/8" corrugations, 2.67" pitch, 43" wide. Both products in lengths to 14' 6", mill finish or embossed.

Reynoside™ — 4" Ribbed Embossed, .032" thick. 1" ribs on 4" pitch. Nominal width 41⅝". Lengths to 22' 5". Embossed.

8" Ribbed Embossed, .032" and .040" thick. 1" ribs on 8" pitch. Nominal width 41⅝". Lengths to 22' 5". Embossed.

V-Beam—.040" and .050" thick. 1⅝" deep beams on 5¼" pitch. Nominal width 44¼". Lengths to 22' 5". Mill finish or embossed.

Like more and more builders of industry, Sundstrand Machine Tool Company chose sandwich walls of aluminum–Reynolds Aluminum–for its new plant at Belvedere, Ill. Aluminum's economy begins at the beginning–with fast, low-cost erection. And it never ends... goes on through year after year of efficient service at minimum maintenance cost. Aluminum never rusts, needs no painting. High radiant heat reflectivity cools interiors as much as 15° in summer. And sandwich walls, with "U" factors as low as 0.155, cut winter fuel costs as well. Call the nearest Reynolds sales office. Or write to **Reynolds Metals Company,** General Sales Office, Louisville 1, Kentucky.

ReynoCoustic™, **the preferred sound conditioning ceiling for large areas, consists of perforated aluminum panels backed with a sound absorbing material. ReynoCoustic provides access to hidden utilities above, helps illumination, too. May be used as air conditioning plenum chamber. Natural or white baked enamel finish. Write or phone Reynolds for name of nearest franchised acoustical applicator.**

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ONLY IN EMERGENCIES DOES THIS HAPPEN— — —

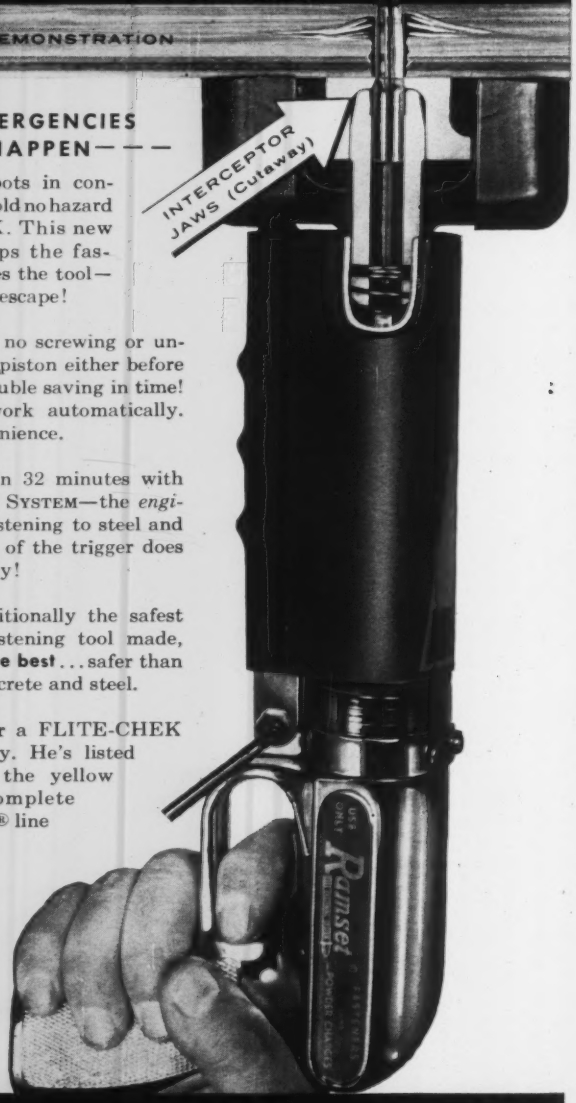
Unexpected soft spots in construction material hold no hazard for FLITE-CHEK. This new RAMSET® tool stops the fastener before it leaves the tool—prevents accidental escape!

Load and fire fast: no screwing or unscrewing of stud or piston either before or after firing—a double saving in time! Interceptor jaws work automatically. No delay or inconvenience.

Do an 8-hour job in 32 minutes with RAMSET FASTENING SYSTEM—the *engineered* method of fastening to steel and concrete. A squeeze of the trigger does tedious jobs instantly!

Now RAMSET, traditionally the safest powder-actuated fastening tool made, **is again first with the best**... safer than ever for work in concrete and steel.

Call your dealer for a FLITE-CHEK demonstration today. He's listed under "Tools" in the yellow pages. See the complete RAMSET-SHURE-SET® line of fastening tools.



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Ramset Fastening System

WINCHESTER-WESTERN DIVISION

OLIN MATHIESON CHEMICAL CORPORATION

12107-C Berea Road — Cleveland 11, Ohio

. . . Unit Prices

Bids: 12-2-57 Items	Unit	Quantity	Unit Prices 1C	1 base
Embank, pav, stone slope, 18"	sy	37,500	30.00	6.40
Alt A riprap, 36"	cy	37,600	5.95C	9.50
Alt B concrete 8"	cy	8,750	26.00	35.00
Pav in channels, stone, 18"	sy	950	24.00	7.50
12"	sy	3,500	17.00	6.00
gutters 8"	sy	3,800	12.75	5.50
Rockfill	cy	10,500	6.50	8.50
Guard posts, timber	ea	32	10.00	12.00
Topsoil	cy	12,400	0.80	1.50
Seeding	ac	11	650.00	650.00
Piling, steel sheet	sf	18,000	4.47	4.67
Conc masonry, fndn slabs	cy	4,800	29.10	52.00
struct	cy	1,430	72.00	52.00
weir	cy	990	39.10	52.00
refill	cy	20	42.00	130.00
Rubber waterstop, tp A	lf	1,580	3.00	4.60
B	lf	300	5.00	7.90
Steel reinforcing	lb	540,000	0.13	0.17
Access bridge	ls	job	1,840	3,200
Railing, pipe	ls	job	1,210	3,200
Steel racks	ls	job	2,160	2,900
Stop plank grooves, CI	ls	job	5,170	8,200
lifting beam	ls	job	443.00	600.00
WIP in spillway weir	ls	job	1,460	1,600
Settlement gage	ls	job	1,630	800.00
Metals, misc	ls	job	2,015	2,300
Alum frame & covers, gate house floor	ls	job	3,420	3,400
misc	ls	job	2,337	2,200
Stop planks	ls	job	2,470	1,900
Underdrain piping, chute & stilling basin	ls	job	8,050	13,000
Hoist, 2 ton	ls	job	2,100	2,700
Sluice gate, 48"	ls	job	3,100	5,000
Outlet pipe, 48"	ls	job	8,470	15,000
Venturi meter	ls	job	22,645	26,000
Contr valve, motor operated	ls	job	2,420	8,000
Water level indicator & recorder	ls	job	2,420	4,000
Sump pump & piping	ls	job	500.00	1,000
Gate house superstructure	ls	job	10,675	11,000
Painting, finish	ls	job	550.00	1,700

Commence: 2-1-58. Complete: 10-31-59
Liquidated damages: $100/cal day

Michigan Bridge

Double-deck bridge will have vertical lift span

This 1,310 ft double-deck bridge over the Portage Canal, between Houghton and Hancock, Mich., for the State Highway Department, will have eight deck-girder spans, a 260 ft vertical lift span and two 120 ft deck-truss anchor spans. It will cost $10,008,888. Hazelet & Erdal, Lansing, Mich., are the consulting engineers.

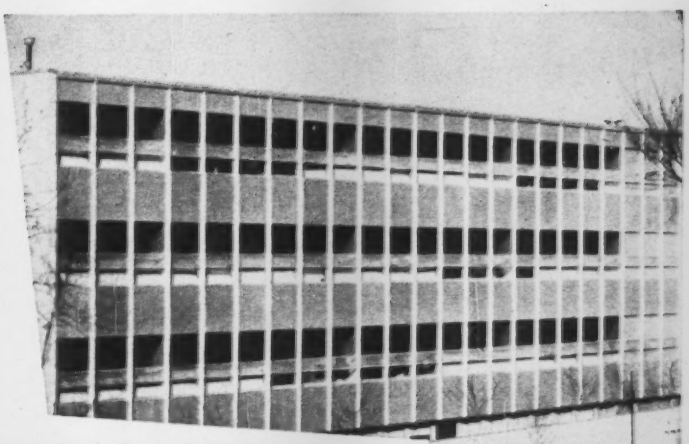
The approaches and substructure went to Al Johnson Construction Co., Minneapolis, Minn., for $4,075,000, 32.5% of which is for three sand island caissons for piers 4, 5 and 6.

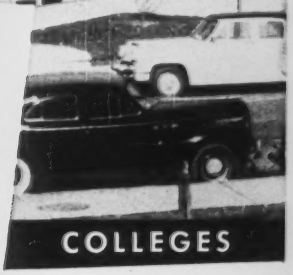
The superstructure contract to American Bridge Division, U.S. Steel Corp., is for $5,933,888. Of this, 69% represents the cost of 11,744,050 lb of structural steel at 25.44¢ to 41.2¢.

The upper deck will carry highway traffic on two 26 ft roadways, with a 4 ft median strip and two 5 ft sidewalks.

The lower deck of the anchor spans will carry the railroad trains. They will use a single track across the lift span and then separate on the anchor spans, the tracks forming Y's at each end of the bridge.

The length of each railroad bridge, including the portion carried on the lift and the anchor span, is about 870 ft. Besides carrying tracks, the lower span is surfaced with two 26 ft roadways





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BAYLEY WINDOWS and Curtain Wall Systems

ALUMINUM OR STEEL

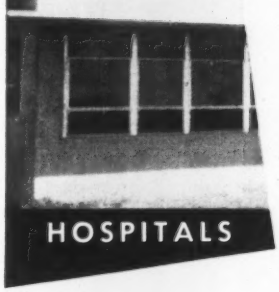
EXPERIENCED ENGINEERING SERVICE AND CONSULTATION—backed by 77 years of continual product development—is a valuable *extra* you gain when specifying Bayley Windows or Curtain-Walls on your jobs.

This extra service, plus a sense of responsibility in a project—from its inception to the occupancy of the building—has for years uniquely identified Bayley among the most demanding Designers and Builders.

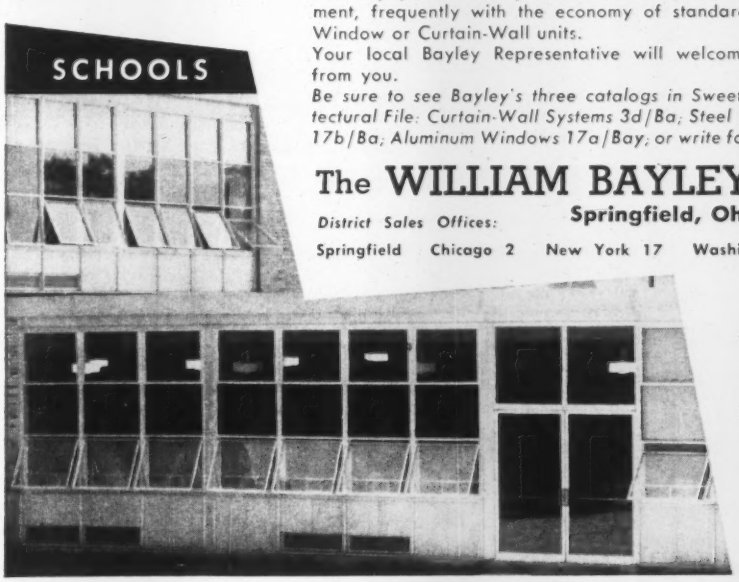
High quality of product? Certainly! By originating and pioneering many of today's most advanced metal window features Bayley Engineers have gained the experience to better assist you. If called in, at the start of your job, they can help you achieve your individual window-wall treatment, frequently with the economy of standard Bayley Window or Curtain-Wall units.

Your local Bayley Representative will welcome a call from you.

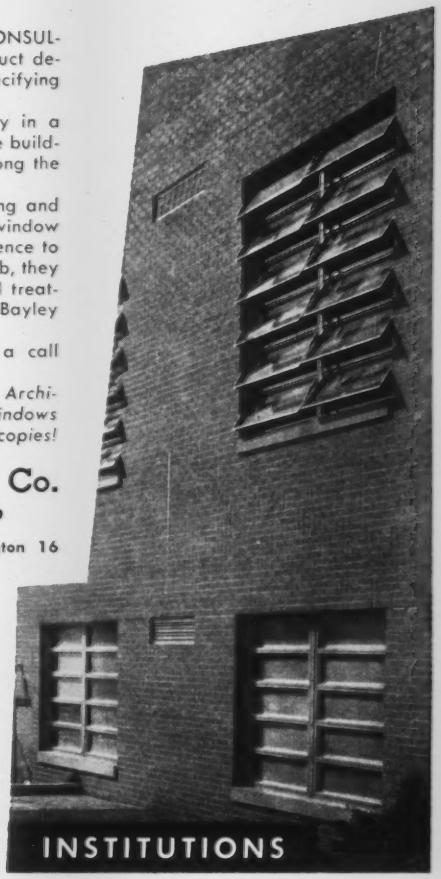
Be sure to see Bayley's three catalogs in Sweet's Architectural File: Curtain-Wall Systems 3d/Ba; Steel Windows 17b/Ba; Aluminum Windows 17a/Bay; or write for copies!



HOSPITALS



SCHOOLS



INSTITUTIONS

The WILLIAM BAYLEY Co.

Springfield, Ohio

District Sales Offices:

Springfield Chicago 2 New York 17 Washington 16

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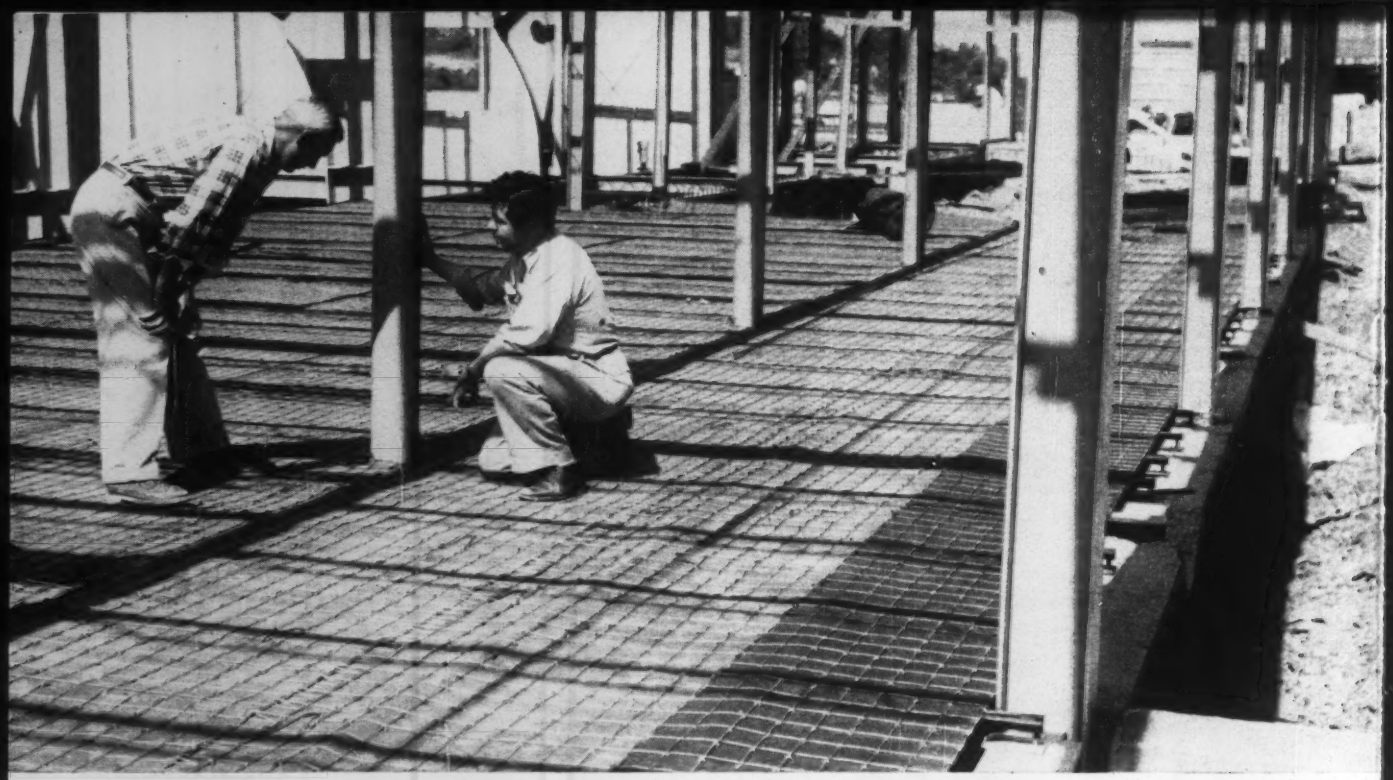


Fastest coverage with Steeltex. Steeltex roll, 125 feet long and 4 feet wide, unrolls quickly and is easily cut to fit around irregular-shaped objects like the steel columns shown above at Penn Township Senior High School near Pittsburgh. Steeltex provided reinforcing and form for 100,000 square feet of floors at this school.

12-Point Comparison Proves

Steeltex Floor Lath Provides Quality Construction But Can Cost Less Than Competing Materials

For more than 30 years, quality-conscious architects, engineers and contractors have specified Steeltex Floor Lath sold by Pittsburgh Steel Products Division of Pittsburgh Steel Company.

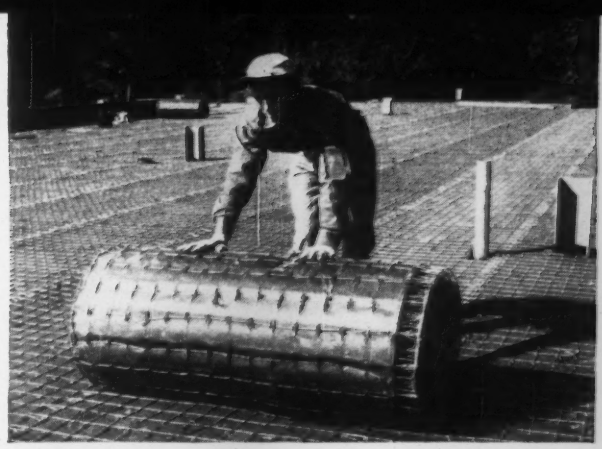
They realize that as a centering material—specially designed for joist construction—Steeltex speeds work, cuts costs and improves the quality of construction. That's why Steeltex has provided form and reinforcing for millions of square feet of floors and roofs set on steel, concrete and wood joists.

Here, at right, are 12 critical points of comparison which show why these men choose Steeltex over other centering materials.

12-Point Comparison

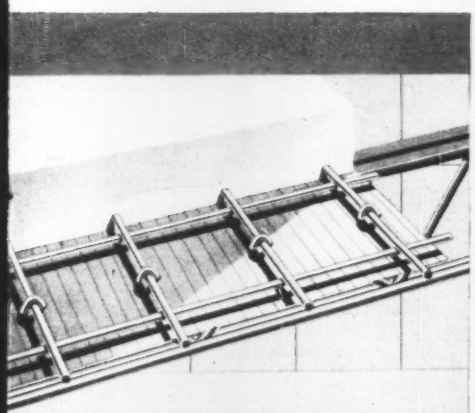
	Steeltex	Sheet Material
Engineering		
(1) Lateral restraint of top chord of joists	Yes	Not assured
(2) Positive reinforcement	Yes	No
(3) Galvanized	Yes	Extra Charge
(4) Continuous reinforcement	Yes	Only by adding mesh
Cost		
(5) Packaging	No charge	Extra bundling and packing charges
(6) Accessories	No charge	Extra clip and washer charges
(7) Lap	Side lap only	Side and end lap
(8) Additional reinforcing	None required	Additional mesh, 10 to 4 gage
(9) Additional reinforcement placing cost	None	Yes
Contractor		
(10) Material	One roll size spans different joist spacings	Many sheet sizes
(11) Weight handling	36# per 100 sq. ft.	⅜ HyRib PI 44# ¾ HyRib PI 60# Corrugated 76# Corrugated Galv. 84#
(12) Faster coverage	Rolls 4 x 125 ft.	Sheets 25 to 28½ inches 6 ft. to 16 ft. 3 inches

Steeltex is easily unrolled by one man. Steeltex weighs only 36 pounds per 100 square feet yet is strong enough to support heavy slabs. Steeltex saves precious construction dollars by permitting on-the-job changes at no extra cost. Steeltex has only a side lap for joining sections together. Clips are furnished free. Sheet material requires side and end laps plus additional reinforcing mesh, 10 to 4 gage. Steeltex needs no additional reinforcing.



Steeltex gives freedom of design. Steeltex, cut and bent easily and quickly here at Ecorse School in Michigan, covers a depressed sanitation facilities area in minutes. Steeltex provides continuous reinforcement. So does sheet material—but only after additional mesh is installed. Yes, Steeltex comes galvanized at no additional cost. There's an extra charge for galvanized sheet material.

Free accessories. Workman at Purdue University's new married student quarters uses clips furnished free to attach Steeltex to steel joists. Steeltex wire mesh reinforcing carries its waterproofed form right on its back and is specially designed for joist construction. Steeltex speeds work, cuts costs, improves quality of construction.



Next time you specify or use a centering material remember these facts. Steeltex, which carries its waterproofed form right on its back, saves time and money—improves quality of construction.

Put Steeltex' advantages to work for you as thousands of others have. Call your nearest Pittsburgh District sales office today. You'll be glad you did.

▶ **See Sweets Catalog Section 2-B**

Steeltex®

Pittsburgh Steel Products

a division of Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

District Sales Offices

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		Houston	Philadelphia	Warren, Ohio

(*Advertisement*)

GILSULATE® Pipe Insulation Digest

FOR UNDERGROUND HOT PIPES

Analyze costs of seven insulation systems

Case Tech chooses Gilsulate

When one of the nation's top technical schools selects your product after long laboratory and field tests you have a right to be proud.

We're doubly proud of Gilsulate: it's been chosen by Case Institute of Technology in Cleveland as the underground hot pipe insulation for its major expansion program—and for rehabilitation of all steam distribution systems on the campus as the need arises.

Case is only one instance of major Gilsulate installations at leading schools, colleges, training centers and other large institutional centers. You will also find Gilsulate protecting underground hot lines in every type of industry, in all parts of the country.

The trend is to Gilsulate. Write for complete details and learn why.

300-FOOT REPLACEMENT LINE going in at Case. Note forms around pipe to conserve Gilsulate.

GILSULATE IS THE SIMPLEST TO INSTALL of any underground hot pipe insulation. An illustrated wall chart, "How To Install Gilsulate," showing the 10 simple steps to follow, has been prepared. We will be glad to send you a copy on request.

How to select underground hot pipe insulation

There are at least 11 important points to look for in choosing insulation for underground hot piping systems. Users' experience with Gilsulate and other insulations under all and varied conditions proves that Gilsulate can out-perform all others. The 11 points are:

1. High resistance to both conductive and radiant heat flow.
2. Stable and non-corrosive in air, acid and alkaline soils, and salt water.
3. Good dielectric.
4. Moisture-proof and vapor-proof *without* jacketing or sealing.
5. Uses readily available materials both in manufacture and installation.
6. Easy and rapid to install, with a minimum of skill and effort.
7. Structural stability under vibration, dead and live loads, during shipping, storage, installation and operation.
8. Adaptable through a wide range of temperatures.
9. Allows pipe to expand and contract.
10. Allows system to be repaired and altered easily.
11. Allows piping leaks to be detected readily.

Gilsulate costs less per installed linear foot than *seven* different types of underground distribution systems, according to a report given by R. D. Hummel at the annual meeting of the National District Heating Association. Mr. Hummel is Manager, Division of Engineering, Yale University.

Based on installations of 1,000 feet of 8-in. welded steam line, and 4-in. welded return, Gilsulate costs $27 per linear foot, including the pipe, digging and insulation. The table below lists the systems compared, and costs.

System	*$Cost/ft.*
Gilsulate	27
Product A, with concrete fill	32
Tile conduit; pipe insulated with magnesia, and wrapped	32
Pipe insulated with magnesia and having metal jacket with protective coating	32
Reinforced concrete pipe over concrete slab, with wrapped magnesia insulated pipe	35
Precast slab envelope with magnesia insulated pipe within	42
Walk-through tunnel with magnesia insulation on lines	120

Here again is convincing proof that poured-in-place Gilsulate drastically cuts underground hot pipe insulation costs, with top corrosion protection and thermal efficiency. Gilsulate's high resin content, water-repellent properties, resistance to all corrosive elements normally found in soil, and high insulating value are unique. No wonder Gilsulate is the ideal—and most economical—solution to underground hot piping insulation problems!

Note: A complete account of Mr. Hummel's talk will be found in the Spring 1957 issue of PIPE INSULATION NEWS, available on request.

American Gilsonite Company

134 West Broadway, Salt Lake City 1, Utah
Eastern office: 3537 Lee Road, Cleveland 20, Ohio
Distributors in principal countries of the world
Affiliate of Barber Oil Corporation and Standard Oil Company of California

All of these items appeared in PIPE INSULATION NEWS. To keep abreast of money-saving hints and developments in underground hot pipe insulation, ask to be put on our mailing list.

to match the upper deck. The lift span is so constructed that when it is not necessary to accommodate railroad traffic, the bridge can be lifted to an intermediate position, where highway traffic can be carried on the lower deck of the lift span. This provides vertical clearance for navigation of 31 ft 6 in. above extreme high water. In raised position, the bridge provides for vertical clearance of 100 ft above extreme high water.

Piers for the tower spans are of caisson type, to permit dredging through wells to sink the caissons. These will be founded 75 ft and 78 ft, respectively, below the surface of the water. The material upon which the caissons will be supported is a very compact sand and gravel interspersed with boulders.

Substructure units for the north approach of the bridge are founded on steel H-piles driven through rock. The south approach spans are founded on rock.

Wages prevailing on the job include: Carpenters, $2.83; shovel and crane operators, $3.125; common labor, $1.975, all including fringe benefits; concrete finishers, $2.90. Structural iron workers are paid $3.30 an hour; in addition to which anyone living more than 35 miles from the job site is paid 7¢ a mile from his home to the job when hired, and the same amount back home when he is discharged or when the job is completed. He is also paid $21 a week subsistance while on the job.

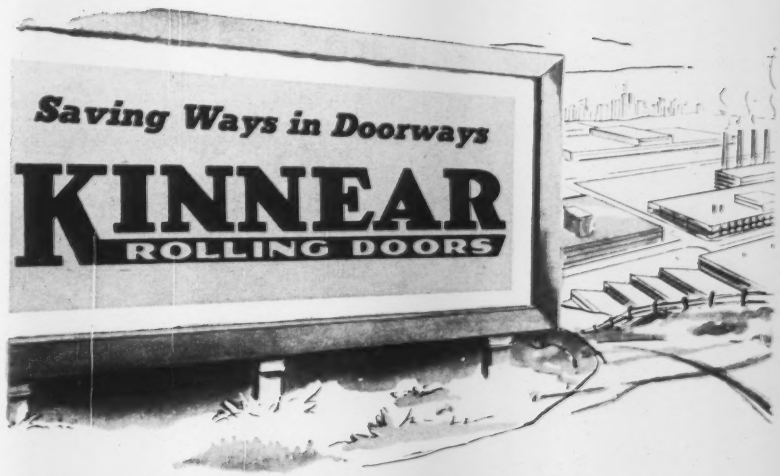
The contractors furnish all materials except 14 in. steel H-piles. Materials can be transported by rail, truck or water.

Here are the bids for the substructure and approaches:

1C Al Johnson Constr. Co., Minneapolis, Minn	$4,075,000
2 L. W. Lamb Co. & Johnson-Greene Co., Holland and Ann Arbor, Mich	4,304,634
3 Dravo Corporation, Pittsburgh, Pa	4,676,425
EE Michigan State Highway Dept. & Hazelet & Erdal, Consulting Engineers, Lansing	4,200,299

Bids: 9-25-57 Items	Unit	Quantity	Unit Prices 1C	2
Clearing	ac	0.2	$250.00	$300.00
Grubbing	sy	26	2.00	3.00
Removing				
trees, 8-10" dia	ea	1	20.00	40.00
old pavement	sy	1,338	0.90	1.00
masonry & concrete	cy	83	8.00	15.00
sidewalk	sy	873	0.40	1.00
curb & gutter	lf	1,206	0.80	0.90
curb	lf	198	0.60	0.70
catch basin	ea	2	40.00	50.00
Excavation, earth	cy	5,757	1.00	1.00
rock	cy	177	8.00	10.00
Backfill, porous, grade B	cy	9	3.00	4.00
sand-gravel, LM	cy	83	2.00	3.00
Concrete, grade A	cy	3	60.00	65.00
headers, grade A	cy	21	40.00	65.00
Cement	bbl	37	6.50	6.00
Steel reinforcement	lb	2,154	0.15	0.16
Expansion hook bolts, ¾"	ea	34	3.50	7.00
Culvert, cl B, ext str, 18"	lf	64	7.00	8.50
Sewer, up to 10' depth, 12"	lf	691	5.50	8.00
15"	lf	219	6.00	9.00
18"	lf	332	6.50	9.00
with open joints, 6"	lf	86	1.75	3.00
Manhole, up to 10' depth, 1A	ea	3	300.00	350.00
Catch basin, up to 10', 3B	ea	4	350.00	350.00
3D	ea	3	350.00	350.00
3E	ea	2	350.00	350.00
6B	ea	4	275.00	300.00
6D	ea	2	275.00	300.00

(Continued on page 78)



A sign of efficiency

for every type of building

Wherever you see Kinnear Rolling Doors, you can be sure there's a high level of efficiency in handling plant traffic — plus other important advantages.

The coiling upward action of the *Kinnear-originated* interlocking steel-slat door curtain makes all space around the door fully usable all the time.

Kinnear Motor Operators add quick, easy, push-button control to this efficiency. They permit you to control any number of doors from a single point, or each door from any number of points.

This cuts traffic delays and bottlenecks and promotes *prompt* door closure, reducing loss of heated air in winter, cooled air in summer.

In addition, Kinnear Rolling Doors assure extra all-steel protection against wind, weather, fire, intrusion and vandalism.

You can't beat Kinnear's 60-year record for providing long, low-cost, dependable door service under hardest daily use. Kinnear Rolling Doors — built to fit any opening — are easily installed in old or new buildings.

Write today for catalog or recommendations.

KINNEAR
ROLLING DOORS
Saving Ways in Doorways

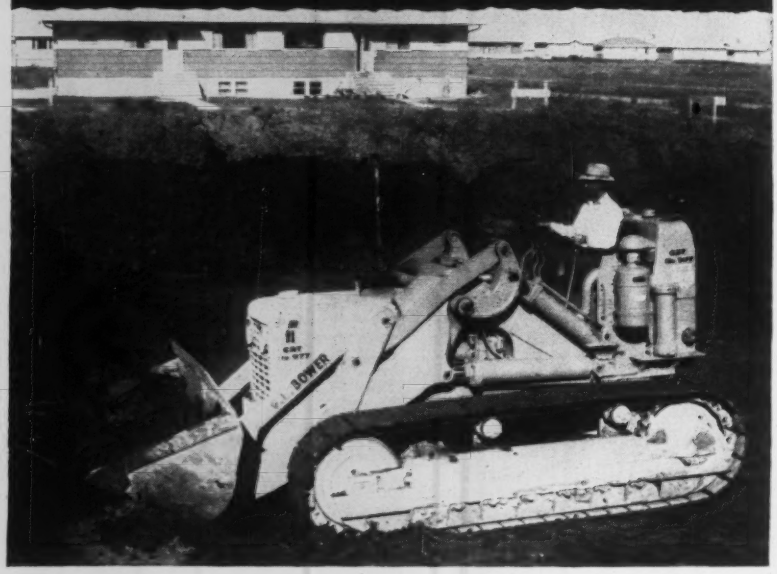
The KINNEAR Mfg. Co.
Offices and Agents in All Principal Cities

Heavily Galvanized! 1.25 oz. of pure zinc per sq. ft. of metal (ASTM Standards) gives Kinnear Rolling Doors **lasting** protection from the elements. Special Kinnear Paint Bond permits paint to be applied immediately after doors are erected, assuring thorough coverage and lasting adhesion.

FACTORIES: 1500-20 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.

Weldynamics

ARC WELDING AT WORK CUTTING COSTS



You can get double the life from your crawler tracks

HARDSURFACING with an automatic welder gives a carefully controlled, long lasting surface.

The Lincoln automatic process deposits a special alloy surface which will stand hard wear twice as long as original equipment. The deposited surface is so smooth that no machining is required. Lincolnweld is fast and inexpensive too.

Many repair shops and tractor dealers offer this service. But be sure to specify Lincoln hardsurfacing. Or, call your nearby Lincoln representative about setting up your own hardsurfacing unit. Write for literature.

The World's Largest Manufacturer of Arc Welding Equipment

LINCOLN

THE LINCOLN ELECTRIC COMPANY · DEPT. 3436 · CLEVELAND 17, OHIO

. . . Unit Prices

Bids: 9-25-57 Items	Unit	Quantity	Unit Prices 1C	
Inlet, up to 10' depth 5B	ea	2	200.00	250.00
5D	ea	1	200.00	250.00
Covers, A	ea	1	70.00	50.00
Manhole covers, adjust	ea	1	50.00	50.00
Water shutoffs, adjust	ea	4	25.00	50.00
Manholes, reconstruct	ea	4	140.00	200.00
Catch basins, reconstruct	ea	3	140.00	150.00
abandon	ea	2	40.00	50.00
Concrete curb, detail 1	lf	301	$2.60	$2.50
2	lf	1,618	2.20	2.25
gutter	lf	30	4.80	3.00
curb & gutter, 7A	lf	162	5.10	3.50
mod. 7A	lf	199	4.90	3.50
driveway return, 15	lf	123	4.80	4.00
pavement, 8" uniform	sy	270	8.00	7.00
base crse, 8" uniform	sy	4,885	6.50	6.00
Pavement reinforcement	sy	5,155	0.70	0.75
Bituminous leveling course	t	289	25.00	18.00
bond coat AE-2	gal	819	0.50	0.45
concrete wearing crse	t	289	25.00	18.00
Aggregate base course	t	404	3.00	3.00
Topsoil surface, LM	cy	20	3.00	1.50
Calcium chloride admixed	t	4	70.00	75.00
Concrete sidewalk, 4"	sf	9,733	0.55	0.50
special	cy	31	40.00	50.00
Bituminous approach mixture	t	14	20.00	18.00
Aggregate shoulders	cy	25	4.00	4.00
Water for wetting (Mgal)	unit	3	10.00	10.00
Steel beam guard rail	lf	179	4.00	4.25
Guard posts	ea	12	4.00	6.00
salvaged	ea	7	2.50	1.00
Sodding, class B	sy	2,076	0.50	0.70
Concrete right of way marker	ea	13	20.00	15.00
Part-width construction	stas	16	80.00	200.00
Final trimming & cleanup	stas	15	20.00	30.00
Mulching	t	2	50.00	60.00
Pipe railing, 2½"	lf	145	4.00	12.00
Grouted flagstone paving	sy	285	2.50	8.00
Subbase, selected	cy	409	4.00	4.00
Fire hydrant, relocate	ea	2	250.00	300.00
Abandoned service conn, plug	ea	1	20.00	25.00
Existing bridge, remove	ls	job	240,000	222,500
Excavation, dry	cy	2,471	6.00	8.00
wet	cy	2,826	7.00	20.00
rock	cy	255	62.00	60.00
Caisson, pier 4	ls	job	315,000	362,000
5	ls	job	433,000	530,000
6	ls	job	577,426	617,000
Cofferdam, pier 3	ls	job	190,000	120,000
Piles, steel, driven	lf	8,150	2.00	3.00
splices	ea	66	115.00	60.00
cutoff	ea	160	5.50	10.00
Piles, treated timber f	lf	41,440	2.50	2.00
dr	lf	40,404	1.50	1.00
cutoff	ea	518	5.00	4.00
Fenders, treated timber	mbm	3.6	1,200	700.00
Piling, stl sht, left in pl	sf	2,777	4.00	3.50
Concrete, Tremie	cy	3,955	22.00	70.00
substructure, grade A (6A)	cy	2,261	169.00	115.00
(6B)	cy	1,581	57.00	95.00
superstruct, grade A (6A)	cy	2,147	77.00	100.00
Cement	bbl	31,960	6.55	6.00
Steel reinforcement	lb	981,857	0.165	0.16
Substruct conc, heat & house	cy	3,320.3	1.40	20.00
Backfill, sand-gravel, LM	cy	6,997	7.00	3.50
Joint filler, 1"	sf	234	1.35	1.50
½"	sf	17	1.30	1.10
¼"	sf	53	1.00	1.30
waterproofing	sf	1,385	1.60	1.50
Rubbed surface finish	sf	29,587	0.43	0.55
Drain casting, assembly, tp 1	ea	24	65.00	45.00
2	ea	84	65.00	60.00
3	ea	12	130.00	110.00
4	ea	12	60.00	50.00
5	ea	12	70.00	55.00
Rock fill	cy	148	9.75	6.00
Roadway drainage, misc	lb	30,930	1.10	1.20
Handhole frame & cover, tp A	ea	19	61.00	60.00
B	ea	5	88.00	70.00
Structural tile, 12"x12"x6"	ea	5,833	0.87	0.50
Anchor bolts, cadmium plated	lb	130	3.20	4.00
Copper	lb	2,512	4.75	2.30
Rubber type filler, hot-poured	lf	326	3.95	3.00
Bridge railing, fabr, erect & paint	lf	3,285	30.00	22.00
Splash plates, erection spans 1 to 5 & 7 to 11, incl	lb	55,700	0.14	0.11
Railway deck waterproofing	sf	14,473	5.10	3.70
drains	lf	1,884	7.50	4.50
Track ballast	cy	372	7.00	7.00
Ties, rails & accessories i	ls	job	8,550	6,500
Blowoff line, 4" & sewer, 6", relocate	ls	job	7,100	4,700
Operator's & generator house, misc	ls	job	22,950	26,900
house plumbing	ls	job	7,200	7,800

(Continued on p. 82)

Concrete treated with Columbia Calcium Chloride sets and reaches required strengths two to three times faster than untreated. It can be added to the mix at the plant or at the job site.

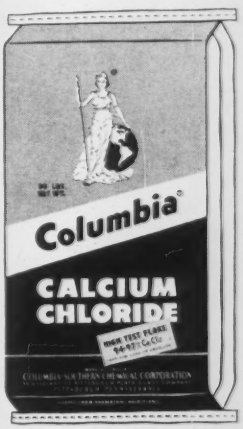
COLUMBIA CALCIUM CHLORIDE cuts days off the schedule by giving you stronger concrete faster

More contractors this spring than ever before are saving days on their schedules. How? By using concrete ready mixes with Columbia Calcium Chloride added. Why? Just look at what they get:

1. Faster initial set. Time is cut from 3 hours to 1 hour under normal conditions. When the temperature drops below 70°F, Columbia Calcium Chloride's effect is even greater.
2. Faster final set. The same ratio holds true; you get final set in 2 hours, rather than usual 6.
3. Accelerated early strength. Columbia Calcium Chloride treatment produces two-day strength in just 24 hours, 7-day strength in 3½ days.

These specific advantages all add up to money saved on earlier form removal and less night finishing, in spite of cold nights. Despite its superior resistance to low temperatures, however, Columbia Calcium Chloride is not an anti-freeze. Normal cold weather protective measures should always be followed. But the protection time will be reduced greatly—often from 7 days to 3—when you use Columbia Calcium Chloride.

For more information, write today to Calcium Chloride Department at our Pittsburgh address.



NEW High Test Flake (94-97% $CaCl_2$) comes in 80 lb. bags that do the same valuable work as the standard 100 lb. bag of Regular Flake (77-80% $CaCl_2$).

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

Subsidiary of Pittsburgh Plate Glass Company • One Gateway Center, Pittsburgh 22, Pa.

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An efficient batch plant and dependable Mack dumpers—two important factors in the modern paving methods used by L. G. DeFelice & Son of North Haven, Connecticut. Ten Mack dumpers supplied the dry mix for the two dual-drum pavers.

On the Connecticut Turnpike...

job time slashed by efficient

L. G. DeFelice & Son finished their section of the Connecticut Turnpike well ahead of schedule . . . thanks to efficient batch-haul paving. Their record for a 10-hour day was 1566 cubic yards—enough concrete for 4255 linear feet of 10-inch, 12-foot pavement. Their daily average over the five-mile, six-lane stretch was almost as high. The job was done with ten Mack dumpers supplying two dual-drum pavers working tandem, with wire fabric laid on the five-inch pour of the first paver.

Comments Joe DeLucia, project superintendent for DeFelice, "This job kept the Macks hustling. But they never let us down. We figure that our investment in paving equipment and crews is too big to gamble with trucks that can't keep going. On the vital hauling jobs, we rely on Macks."

The medium-sized Mack dumpers used for this important batch hauling were equipped with Mack

Each Mack dumper carried five 1⅓-yard batches. First batch dumped by opening tail gate. Air-operated batch boards, designed by Equipment Supervisor Felix DiGiusto, speeded dumping of the other four batches. Quickly removable batch boards convert trucks to conventional dumpers with a 10-yard capacity.

batch-haul paving

Quadruplex transmissions, four-wheel drive Mack Balanced Bogies with Power Divider, economical 150-horsepower Magnadyne gasoline engines, and power steering.

To find out how you can do more work at lower cost with fewer trucks, call in your Mack representative. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

MACK

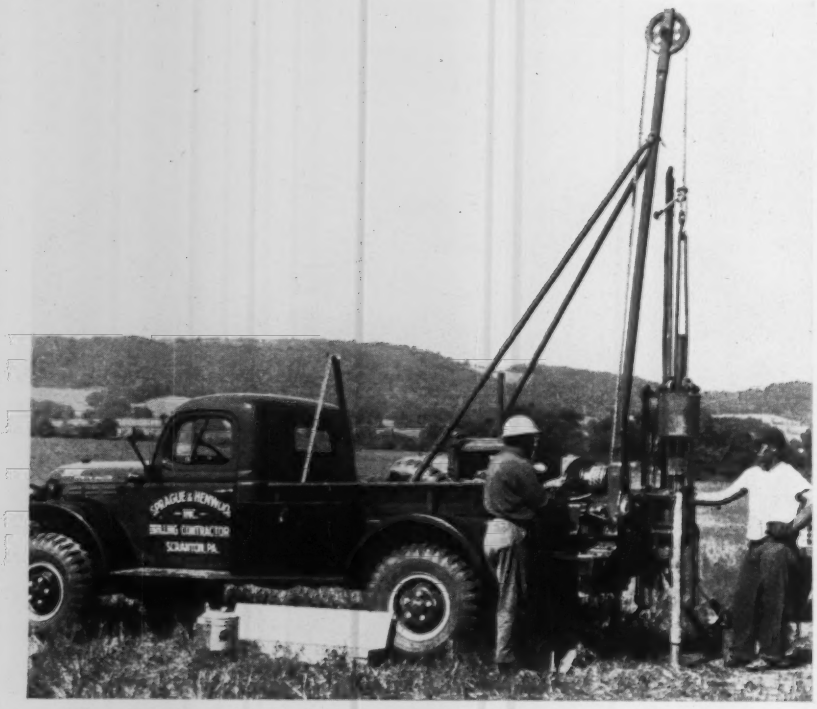
first name for

TRUCKS

5785

SUB-SURFACE INVESTIGATIONS FOR THE STRUCTURE YOU ARE PLANNING

Highways · Tunnels · Bridges · Buildings · Dams



A Sprague & Henwood Drill Crew Recovering Soil Samples For A Highway Relocation Project

The lasting success of any construction project depends on the design of a proper foundation; and the design, in turn, depends on an adequate knowledge of the sub-surface soil and rock.

Sprague & Henwood's unbeatable team of experienced drill crews, modern equipment, and expert supervision is your assurance that the soil samples and rock cores recovered will be the best obtainable under the conditions that prevail. The structures of tomorrow are only as good as they are designed today, based upon a complete, accurate, and dependable sub-surface study.

Behind Sprague & Henwood's drilling and supervisory personnel is 75 years of accumulated knowledge and experience, gained from completing thousands of successful drilling contracts, under every conceivable condition.

The equipment used is first-quality and of the proper type. It is built in Sprague & Henwood's own plant, and is "field-tested" prior to being put into general use to insure customer satisfaction and completion of the job in the shortest possible time.

Crews and adequate equipment are located throughout the United States. Other services include grout-hole and blast-hole drilling and pressure grouting.

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. . . Unit Prices

Bids: 9-25-57 Items	Unit	Quantity	Unit Prices 1C	2
Bri elec wk, fiber cond, 4"	lf	703	1.00	1.20
2"	lf	1,040	0.80	1.00
Motors & brakes	ls	job	35,630	36,146
Switch boards, contr desk & equipment	ls	job	48,045	49,988
Limit switches, speed gov & Selsyn trans	ls	job	19,262	21,534
Traffic lts, gate aviation obstr lt & navig. sigs.	ls	job	15,687	16,810
Liftspan roadway lighting	ls	job	3,467	3,968
Conduit, wiring & serv ltg	ls	job	22,929	22,807
Power cable, contr cable & term cabinets	ls	job	29,561	32,781
Highway approach ltg	ls	job	18,602	24,166
Gaso eng driven gener unit	ls	job	12,950	13,504
Tower manlifts	ls	job	32,420	24,382
Railway signal system	ls	job	127,728	146,718
Field painting	ls	job	68,500	76,250

The bidding on the structural steel contract went like this:

1C American Bridge Div., U. S. Steel Corp., Detroit, Mich	$5,933,888
2 Allied Structural Steel Companies, Chicago, Ill	6,101,306
3 Bethlehem Steel Co., Bethlehem, Pa	6,205,507
EE Michigan State Highway Dept. & Hazelet & Erdal, Consulting Engineers, Lansing	4,200,299

Bids: 5-23-57 Items	Unit	Quantity	Unit Prices 1C	2
Structural carbon steel spans 1, 2, 3, 4, 8, 9, 10 & 11 f&e	lb	2,396,530	$0.2541	$0.28
5, 6 & 7 f&e	lb	7,724,100	0.3785	0.39
Structural low alloy steel spans 5, 6 & 7 f&e	lb	639,780	0.412	0.42
Structural carbon steel, spans 1R to 8R (E&W) incl f&e	lb	983,640	0.3005	0.32
RR floor plates, spans 5 & 7 f&e	lb	129,600	0.3082	0.32
1R to 8R (E&W) incl f&e	lb	342,750	0.349	0.35
Stl castings, high str	lb	98,100	0.782	0.75
Structural castings	lb	102,290	0.7215	0.65
Misc rail access & work	ls	job	18,145	16,500
Roadway floor, open grid, 5"	sf	12,760	7.00	7.50
Conc filled grid floor, 4½" tee grid sidewalk floor, 2"	sf	15,230	6.21	6.00
	sf	9,040	6.24	6.00
Splash plates, spans 1 to 5 & 7 to 11, incl f&f	lb	55,700	0.42	0.35
Counterw rope sheaves	lb	394,260	$0.865	0.90
ropes & sockets	ls	job	124,500	110,000
Balancing chains	lb	157,800	0.462	0.50
Machinery	lb	183,300	1.29	1.50
special	ls	job	342,830	325,000
Counterw, billet steel	lb	342,700	0.134	0.10
conc, Cl A (6A)	cy	864	90.00	80.00
Cement	bbl	1,549	5.25	5.50

Completion scheduled: 12-15-59

f&e fabricate and erect
f&f furnish & fabricate

Alaskan Highway

Contract permits winter suspension of project

Borrow at $1.25 and overhaul at 45 cents a cu yd, amount to over one-fourth of this job, which also includes Class A concrete at $160 a yd, Class S concrete at $320 per yd, and structural steel at 40-43 cents lb. This $399,377 award to Cole and Paddock, Juneau, Alaska, by the Bureau of Public Works at Juneau, is for two concrete and structural steel bridges and 0.950 mi of C-0011 grading on an extension of the Glacier Highway in Tongass Forest, Alaska.

The Herbert River Bridge is 140 ft long and the Eagle River Bridge 210 ft long, each with a 24 ft roadway.

The contractor may request an order to suspend work for the winter, which

ENGINEERS AND CONTRACTORS:

Ellicott 10" "DRAGON" building turnpike in Connecticut.

ELLICOTT HYDRAULIC DREDGES
are vital to road construction

Unstable earth materials – in fact, all water-bound solids – call for selection of hydraulic dredges for road construction. Contractors almost universally prefer Ellicott dredges to obtain lowest cost per cubic yard of stable fill.

Particularly applicable to road-building in low-lying, boggy inland areas, Ellicott "DRAGON" Model Hydraulic Dredges are specially constructed to be taken apart and reassembled easily, allowing them to be transported overland from job to job by truck or lowboy, the primary problem of work in land-locked sections. Very little water is needed for flotation, while the discharge pipes of the Ellicott "DRAGON" can be set up to transport excavated material over distances of more than half a mile. The result of all these qualities?...a highly efficient and economical dredge whose versatility and portability make it a unique example of engineering skill "custom-tailored" to the job at hand.

"DRAGON" Model Hydraulic Dredges, built in size ranges from 8 to 20 inches for every dredging requirement, are the most economical means available for moving water-bound solids. Designed and manufactured by the Ellicott Machine Corporation, the oldest and largest exclusive builder of dredges and dredging equipment in the world. For more information, write for full, descriptive literature.

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Ellicott Dredges

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Completely noiseless.
Space-saving.

Johnston pumps: 4 to 30 inches; 1½ to 1000 hp.; 25 to 10,000 gpm.

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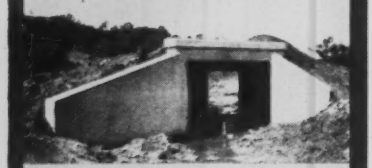

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. . . Unit Prices

will be furnished by E. H. Swick, Regional Engineer for the Bureau of Public Works, when no more work can be accomplished during 1958. No contract time for performance will be charged between the date of the suspension order and the order to resume work in 1959.

The Eagle River flows past the borrow pit, and the contractor must operate with minimum interference to migrating salmon on their way to the spawning areas, and must keep the river clear of silt on spawning beds in the area.

The contractor furnishes all materials, and must provide an office for the engineer, without cost, for the duration of the work. When he furnishes equipment for force account work, he will be paid these rates:

Type of Equipment	Rate per Hour (incl fuel, lubricants & repairs)
Crane or shovel, ¾ cu yd	$28.38
Crane, 25 ton	35.00
Tractor caterpillar, D4 w dozer	10.60
D6 w dozer	17.85
D7 w dozer	20.06
D8 w dozer	21.58
Motor patrol, No. 12	13.66
Winch truck, 5 ton	9.87
Flatbed truck	7.48
Pickup truck	2.55
Dump truck, 4 cu yd	7.14
6 cu yd	10.45
Compressor, 125 cu yd	4.80
210 cu yd	6.08
500 cu yd	12.03
Welder, 300 amp	3.96
Pile driver hammer with leads, 3000#	1.50
5000#	1.75
Truck w lowboy trailer	28.48
Concrete mixer, ½ cu yd	4.75

Timber is untreated Sitka spruce, construction grade or better, or Douglas fir 1750f dense construction grade or better, or other species of timber approved by the engineer.

All structural steel rods, plates and bars shall be ASTM A373. Class A structural concrete requires 6.5 sacks of cement per cu yd, 4-7% entrained air, and Class S, non-vibrated, takes 7.0 sacks of cement, 3-6% entrained air. Air content shall be determined by AASHO T 152 or T 121.

Minimum wages set for this job include: tenders, carpenters, $3.52; concrete workers, $3.62; bulldozer operators, $4.10; steel erection power machine operators, $4.27; scrapers; $4.27; shovel operators, 3 yd and under, $4.52, over 3 yd, $4.84; dump truck operators up to and incl 5 yd, $3.65, 5 to 12 yd, incl, $3.87; general labor, $3.52.

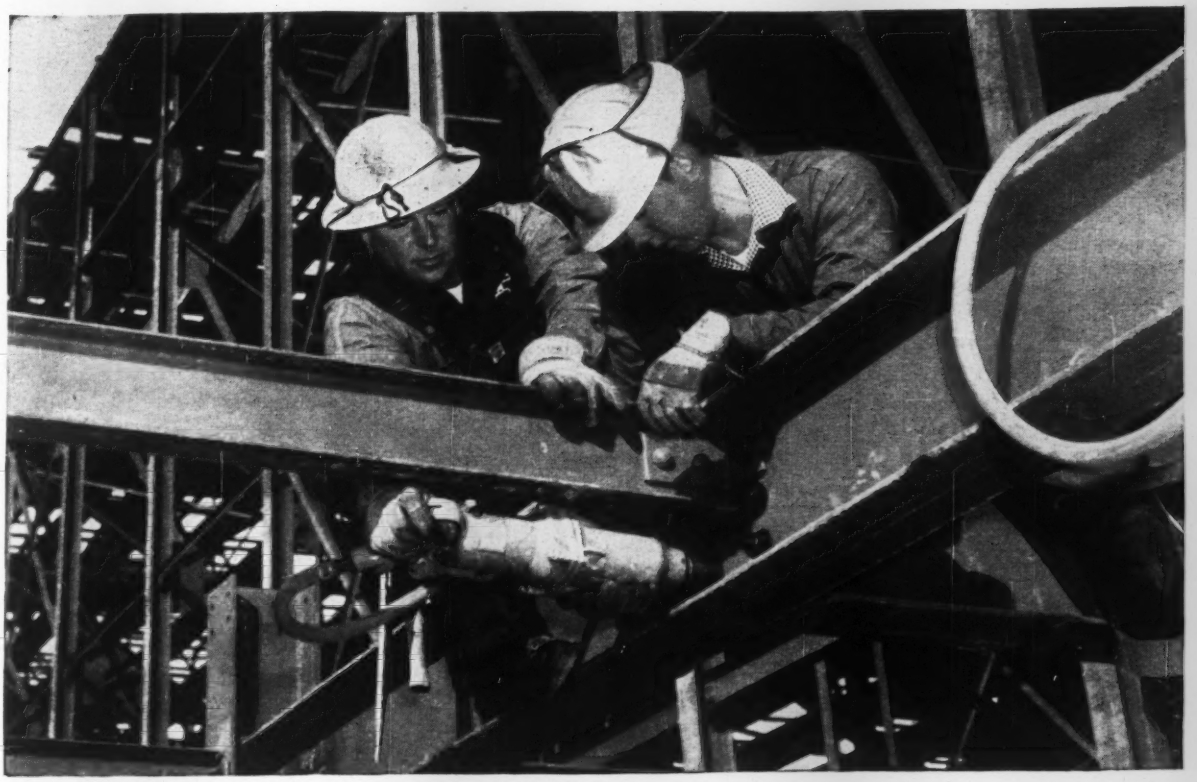
The bidding went like this:

1C	Cole & Paddock, Juneau, Alaska	$399,377
2	Nygren Constr. Co., Seattle, Wash	446,578
4	Morrison Knudsen Co., Anchorage, Alaska	575,944

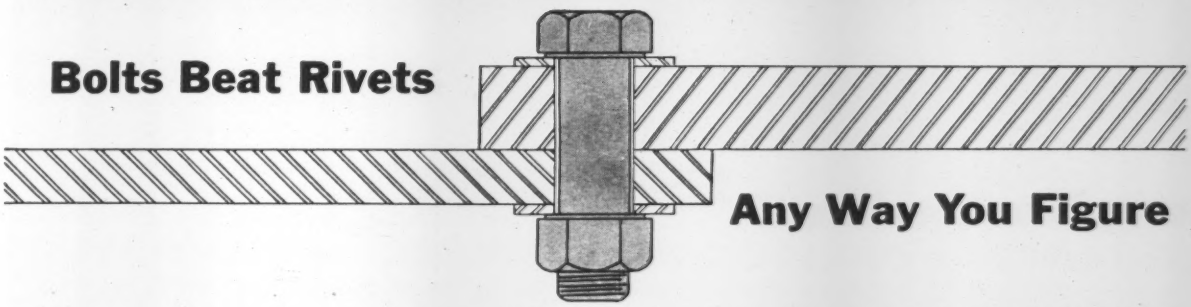
Scheduled 1: Herbert River Bridge

Bids: 12-20-57 Items	Unit	Quantity	Unit Prices 1 C	2
Extra & misc work	ls	job	$2,000	$2,000
Excavation, structural	cy	155	6.00	50.00
Struct stl piles, 10BP42...f	lf	1,080	6.50	8.00
dr	ea	36	300.00	300.00

(Continued on page 86)



Bolts Beat Rivets



Any Way You Figure

SHEFFIELD

High Strength Structural Bolts

Authorities on structural steel framing say that bolting costs less than riveting, saves time, and gives greater strength. Records show that high-strength bolts, tightened to recommended tension, won't loosen—even under severe vibrational loads. Plus these other advantages:

Less labor: Two men can be trained quickly to fit and tighten 350 to 450 bolts per shift. Compare that with 175 rivets for the average highly skilled (and scarce) four-man riveting crew which requires years of training.

Lower costs: A leading architectural journal says high strength bolts are replacing rivets at savings up to 40%.

Greater strength: Industrial Fasteners Institute tests show that two high-strength bolts have the shear strength of three rivets.

Easier, Quieter, Safer: High-strength bolting is much more favorable to worker health and safety. Less noise, too. The pneumatic impact wrench used in bolting makes less than half the noise of a rivet gun.

For better, stronger steel structures at less cost, get all the facts about Sheffield High-Strength Bolts from your nearest Sheffield office.

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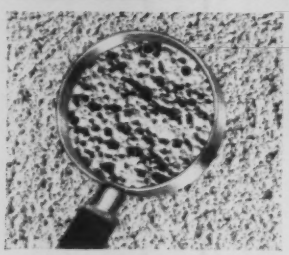
Send NOW for full case study . . .



At Danly Machine Specialties, Inc., Cicero, Ill., insulation problems posed by roof-top parking were solved by Borg-Warner's new BETOCEL Cellular Insulating Concrete (inset). Unique cellular structure affords maximum insulating value and strength . . . with minimum weight and cost.

New light-weight insulating concrete solves 2 problems . . . cuts costs 48%

Problem: Designed for roof-top parking, the building you see above presented an unusual problem in roof insulation. Since the building was to be air conditioned, high insulating value was a "must." But so, too, was strength . . . for the insulation would have to withstand the weight of almost 400 tons of automobiles!

Solution: After a careful study, the material chosen was BETOCEL Cellular Insulating Concrete, Borg-Warner's new light-weight fill for roofs and floors!

Results: Not only were the twin requirements of strength and efficiency met and surpassed, but BETOCEL did the job at 48% lower cost than the competitive materials considered. Overall net savings on the 90,000 sq. ft. job: more than $23,000!

Results like this are typical of the kind of savings you may well realize with BETOCEL Insulating Concrete! Get full details now by returning the coupon below.

Quickly, easily installed, BETOCEL is the ideal insulating fill for wet-poured roofs and floors. No other light-weight concrete gives you all these wanted features:

- *Controlled density*
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- ☐ complete A.I.A. File
- ☐ BETOCEL sample
- ☐ distributorship details

Name_____
Company_____
Address_____
City_____ State_____

8292

. . . Unit Prices

Bids: 12-20-57 Items	Unit	Quantity	Unit Prices 1C	2
Splices	ea	5	50.00	100.00
Pile core stoppers	ea	32	50.00	100.00
Conc, Class A	cy	229.5	160.00	200.00
Stl, reinf, intermediate gr	lb	27,900	0.23	0.30
structural, A-373	lb	27,160	0.40	0.45
A-242	lb	57,090	0.41	0.45
Dismantle existing bridge	ls	job	8,000	3,000
Riprap, loose rock	cy	180	15.00	20.00
Guideposts	ea	4	30.00	20.00

Schedule 2—FHP 2-0

Extra & misc work	ls	job	1,000	1,000
Clearing & grubbing	ac	8.6	2,000	2,000
Excavation unclassified	cy	1,000	3.50	4.00
borrow, Case 1	cy	71,000	1.25	1.25
structural	cy	225	10.00	10.00
Overhaul	stav	2,000	0.04	0.05
of borrow, Case 1	ym	43,000	0.45	0.50
CMP, asbestos bonded, 18"	lf	380	8.00	10.00
24"	lf	318	10.50	20.00
Bit ctd struct plate pipe arch	lf	62	75.00	60.00

Schedule 3—Eagle River Bridge

Extra & misc work	ls	job	3,000	3,000
Excavation, structural	cy	225	10.00	50.00
Piles, timber, untreated f	lf	675	1.00	3.00
struct stl, 10BP42 f	lf	760	6.50	8.00
timber, untreated dr	ea	27	300.00	200.00
struct stl, 10BP42 dr	ea	20	150.00	300.00
Splices	ea	2	50.00	100.00
Pile core stoppers	ea	16	150.00	100.00
Concrete, Class A	cy	240.8	160.00	200.00
S	cy	21.3	320.00	150.00
Stl, reinf, intermediate gr	lb	41,220	0.23	0.30
structural, A-373	lb	41,700	0.43	0.45
structural	lb	107,185	0.42	0.45
Guideposts	ea	4	30.00	20.00

Completion schedule: 300 days after receipt of notice to proceed
Liquidated damages: $100/cal day

Chicago Sewer Tunnel Includes River Crossing

This 5 ft 3 in. x 5 ft 10 in. concrete sewer in Maine Township, Cook County, Ill., is in 12,940 ft of tunnel, 240 ft of which is river crossing. It will serve new residential and industrial areas. The $1,536,850 award by Chicago Metropolitan Sanitary District, to Kenny Construction Co., is 16.7% below engineer's estimate. H. P. Ramey is chief engineer.

Wages prevailing in the Chicago area include: Carpenters, $3.65; tractor operators, including bulldozers, $3.25-$3.35; common laborers, $2.85, all including fringe benefits.

Here is how the bidding went:

1C Kenny Construction Co., Skokie, Ill	$1,536,850
2 Santucci Constr. Co., Skokie, Ill	1,584,180
5 Anthony Pontarelli & Son, Franklin Park	2,176,300
EE Metropolitan Sanitary District, Chicago	1,844,000

Bids: 10-24-57 Items	Unit	Quantity	Unit Prices 1C	2
Sewer in tunnel, 5'3", internal width	lf	12,700	$86.50	$91.00
River xing in tunnel	lf	240	100.00	130.00
Sewer, 24"ø	lf	100	35.00	29.00
Junct chambers	ea	3	3,000	5,500
Gate chamber	ls	job	25,000	40,000
Treatment works, abandon	ls	job	10,000	12,000
Manhole, drop	lf	400	110.00	100.00
offset base	ea	4	750.00	1,000
standard	lf	500	25.00	36.00
drop pipe	lf	300	15.00	22.00
Reinforcement bars	lb	1,200,000	0.13	0.12
Steel ribs	lb	800,000	0.14	0.10
Iron castings & misc met	lb	26,000	0.30	0.28
Concrete bulkheads	cy	10	50.00	60.00
remove	cy	10	150.00	40.00
Timber bulkheads	Mfbm	5	150.00	120.00
remove	Mfbm	5	30.00	60.00
Exc, rock	cy	500	20.00	20.00
add earth in tunnel	cy	100	10.00	10.00
open cut	cy	100	5.00	5.00
Conc, cl B, add in tunnel	cy	100	24.00	24.00
in open cut	cy	100	22.00	22.00
F, additional	cy	400	20.00	20.00

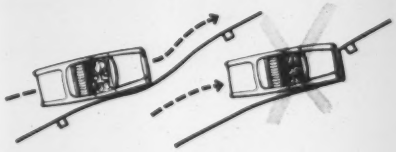
Complete: 500 cal days. Liquidated damages: $100 day

AVAILABLE NOW! Granco Steel Products Company, leading building-products manufacturer in the Midwest, introduces new deep-beam Guard Rail for highways and bridges—available through distributors in principal cities.

HI-STRENGTH VISUAL BARRIER. Tough carbon steel. Corrugated shape. Acts as a continuous impact-resistant beam. Highways—12-gage; bridges—10-gage. Force of collision is absorbed by posts on *both* sides of the impact. Highly visible, reflects light day and night.

GREATER SAFETY. Granco Guard Rail reduces highway hazards, minimizes serious accidents and road "hogging," inspires driver confidence, channels out-of-control vehicles back onto road with least damage, lessens danger to other cars.

NO POCKETING! Guard Rail deflects cars *parallel* to roadway, can't trap them in a collapsing pocket (see drawing).



Beam strength and height prevent cars from hurtling over or going under rail. Flared end sections help prevent cars from hitting the end of a rail head on.

INTERCHANGEABLE SECTIONS. Standardized units have been adopted by American Association of State Highway Officials. Damaged sections do not impair efficiency of undamaged sections, may be rolled out and re-used.

ECONOMICAL. Sections nest conveniently for compact shipment, are easy to handle and install. Accessories are furnished with rail. Granco Guard Rail is painted with a rust-inhibitive primer, uniformly applied by "flow coating" and then baked to a hard-enamel finish.

IDEAL FOR BRIDGES. Granco Guard Rail provides a safe approach, permits maximum use of roadway, reduces center-line crowding, protects trusses.

NEW PRODUCT MANUAL! Contains eight pages of application photographs, standard drawings, specifications, curving data, installation instructions and facts on non-highway use. WRITE FOR YOUR FREE COPY TODAY. Attn.: Dept. E-81.

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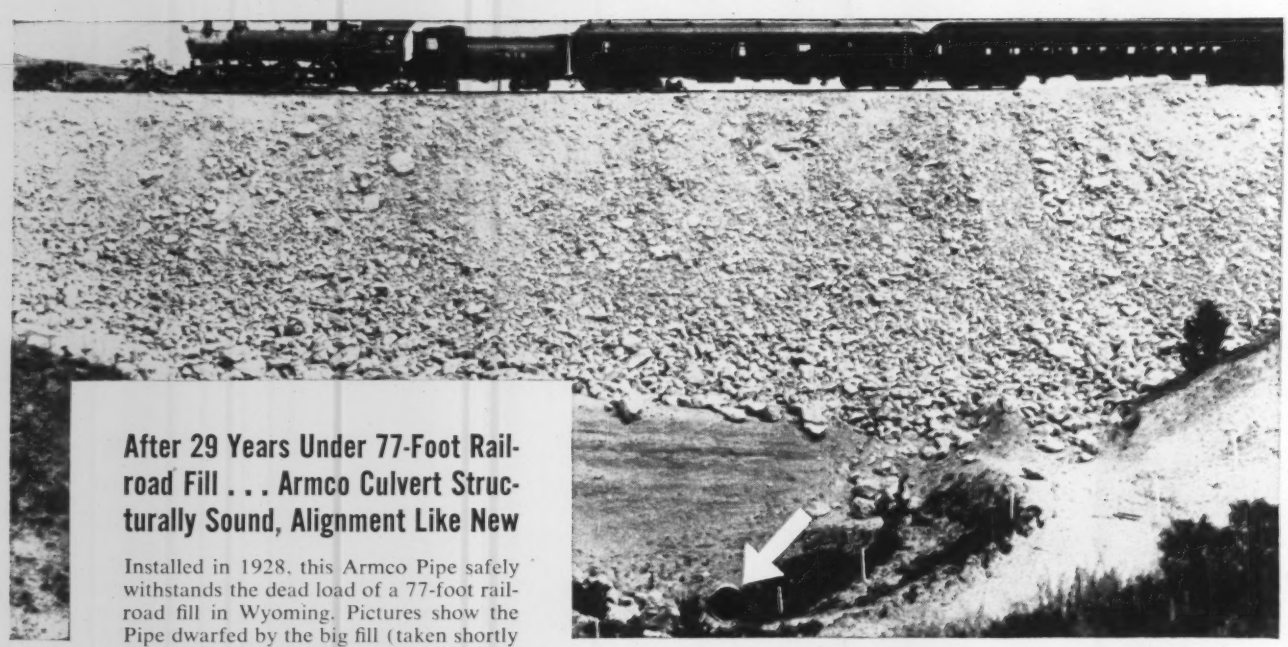
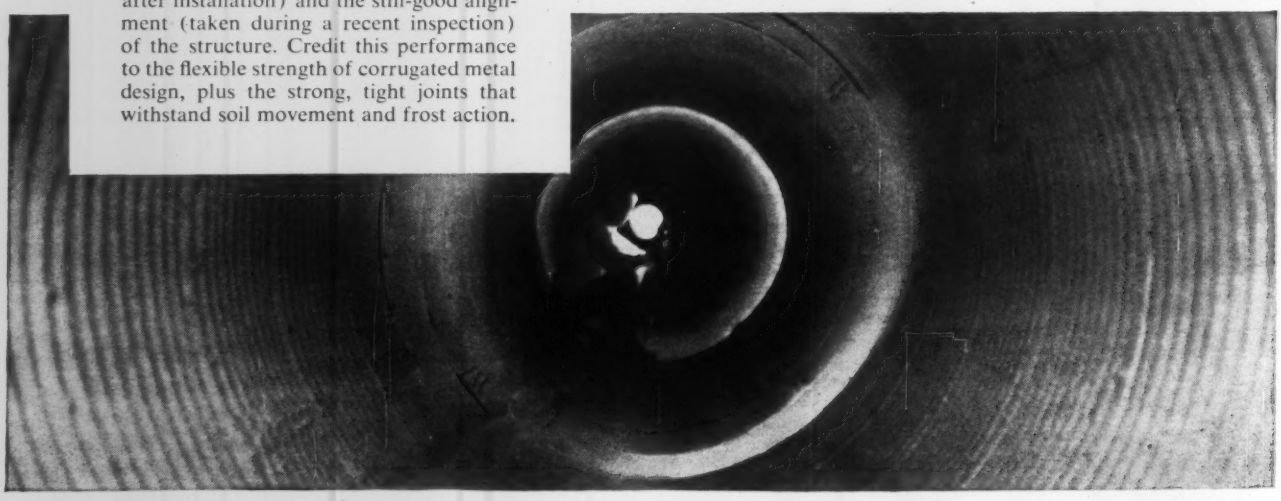
Proved durability is the surest kind of economy. Your initial cost is spread over many years. Thus, long service life of Armco Drainage & Construction Products on highway, municipal and private projects means low cost per year. Look how these Armco Product histories prove their long-range economy.



After 29 Years Under 77-Foot Railroad Fill . . . Armco Culvert Structurally Sound, Alignment Like New

Installed in 1928, this Armco Pipe safely withstands the dead load of a 77-foot railroad fill in Wyoming. Pictures show the Pipe dwarfed by the big fill (taken shortly after installation) and the still-good alignment (taken during a recent inspection) of the structure. Credit this performance to the flexible strength of corrugated metal design, plus the strong, tight joints that withstand soil movement and frost action.



low cost per year of service Construction Products

Storm Sewer in Service Since 1914

For more than 42 years, this 36-inch Armco Pipe has been providing storm sewer service for an Idaho city. Present condition is rated good, with the likelihood of many more years of service. This is real economy through durability.

Early Armco Steel Building Demonstrates Long Service, Low Upkeep

Erected in 1939, this 40- x 60-foot Armco Steel Building serves the Bishop Stansell Company, West Carrollton, Ohio, Development Engineers for the printing industry. One reason for the present excellent condition of this plant is the extra metal thickness of the STEELOX® Panel Wall and roof covering. Extra thickness means more durability—and in Armco Steel Buildings the covering material is up to 66 per cent thicker than that on ordinary metal buildings.

County Proves Armco Walls in Slope Control Application

One of the first installations of Armco Bin-Type Retaining Walls was made in 1938 to control the slope above this county road in Ohio. Other types of slope control had been tried here, but were unsuccessful. Then, in 1954, after the durability and stability of the Armco Wall had been proved in service, the county solved a similar problem on a slope below the road. Picture shows the new wall under construction (foreground) and the first wall still on the job (left background).

Write for More Information

Get helpful, free data on service-proved Armco Drainage and Construction Products—including Armco SMOOTH-FLO® Sewer Pipe, FLEX-BEAM® Guardrail, Bin-Type Retaining Walls, Steel Buildings, Water Control and Sewage Gates, Steel Sheeting and a wide range of Corrugated Metal Drainage Structures. Write us, or call our nearest sales office. Armco Drainage & Metal Products, Inc., 5317 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

Armco Construction Products

ARMCO®

What New Jersey Schools Cost . . .

A new report on school costs shows cost per pupil as well as cost per square or per cubic foot. This study, by Cleve O. Westby, director, School Building Services, Department of Education, State of New Jersey, in Trenton is continuing in even more detail.

Results of this first report show that new elementary schools cost from $549 to $2,268 per pupil, junior high schools range from $918 to $3,145 per pupil and senior high schools from $1,235 to $3,845.

The elementary school costs are for schools built from July 1, 1956, through June 30, 1957. The junior and senior high schools cover those built from 1950 through 1956. In order to compare these costs on a relatively equivalent basis, ENR has updated them by applying the rise in costs measured by the ENR Building Cost Index.

Individual school costs (or prices to the taxpayers) are shown in the accompanying tables, organized by type and size of school (in pupil capacity).

New Elementary Schools

Construction Costs
July 1, 1956-June 30, 1957
(ENR Bldg Cost Index 489-507)

Capacity No. pupils	Gross Area sf/pupil	Construction Costs per pupil	per sf
K-1			
80	91	$1,275	$13.93
K-2			
300	54	549	10.19
420	46	672	14.52
K-3			
170	48	1,081	22.68
205	92	1,910	20.76
440	55	767	13.92
450	57	915	15.92
K-5			
350	63	1,200	19.14
K-6			
150	67	990	14.85
200	38	703	18.39
205	51	1,157	22.52
230	66	1,263	19.06
260	80	1,007	12.56
290	49	566	11.52
290	108	2,132	19.72
295	65	1,050	16.06
300	34	650	19.11
360	49	566	11.52
360	72	1,594	22.07
400	57	789	13.78
425	96	1,747	18.13
430	57	785	13.78
440	67	1,225	18.26
445	68	1,314	19.40
455	71	1,332	18.68
460	66	1,530	23.23
460	48	785	16.18
500	47	730	15.59
500	60	707	11.86
520	55	1,017	18.59
530	53	767	14.41
560	63	1,281	20.36
760	53	932	17.69
K-7			
260	73	974	13.29
K-8			
500	37	683	18.44
540	46	693	14.97
600	48	778	16.05
610	43	720	16.68
640	46	761	16.51
670	43	673	15.55
1-3			
360	86	2,268	26.47
425	96	1,747	18.13
1-4			
120	67	1,033	15.48
1-6			
300	66	996	15.09
1-8			
240	54	682	12.61
4-8			
300	59	999	16.84
5-8			
300	63	903	14.30
300	60	1,018	16.83
300	57	721	12.72
960	70	1,142	16.39
6-8			
480	86	1,272	14.80

INCLUDE the five basic construction contracts. DO NOT INCLUDE architects' or legal fees, furniture, land or extensive site development.

Construction costs adjusted to February, 1958 using ENR Bldg Cost Index 516

New Junior High Schools

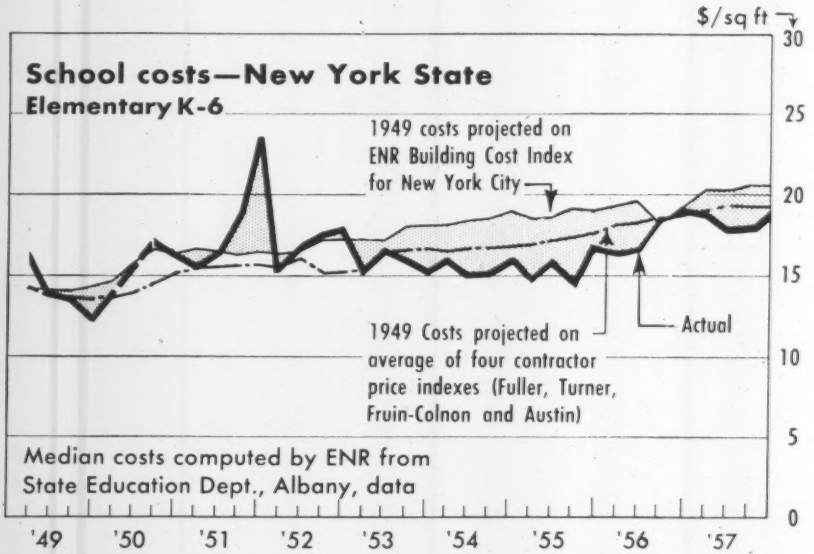
Capacity No. pupils	Date Built	ENR Bldg Cost Index	Size pupil cf	Size pupil sf	Cost adjusted to Feb. '58 per pupil	per cf	per sf
400	June '51	401	2,375	152	$2,888	$1.21	$18.86
500	Jan. '53	425	1,465	106	1,782	1.21	16.82
515	Nov. '50	390	1,728	94	1,446	0.83	15.36
520(a)	May '56	487	1,257	86	1,456	1.15	16.96
600(a)	Apr. '52	408	1,254	85	1,588	1.26	18.74
600	Aug. '52	422	1,833	115	1,895	1.04	16.47
600	Oct. '53	436			1,599		
600(a)	July '56	489	1,213	93	1,411	1.16	15.23
650(b)	Mar. '57	501	1,480	108	2,067	1.40	19.29
700	Sept. '56	500	947	69	918	0.97	13.37
750	Apr. '55	461	1,380	92	1,980	1.43	21.26
820	June '55	465	1,730	105	2,049	1.10	18.22
850	May '57	503	1,421	99	1,835	1.28	18.45
868(a)	Mar. '57	501	1,440	99	1,368	0.95	13.85
900	Apr. '55	461	1,780	125	2,186	1.22	17.51
1000	Aug. '54	456	1,656	105	1,843	1.11	17.49
1000	Dec. '54	457	1,465	97	1,717	1.16	17.52
1000(b)	Feb. '56	483	964	69	1,102	1.14	16.08
1000	Apr. '57	501	1,650	108	1,852	1.12	17.14
1000	June '57	504	1,390	106	1,830	1.31	17.32
1050	June '55	465	1,513	99	1,498	0.92	13.44
1100(a)	June '54	440	1,370	99	1,454	1.07	15.95
1100	Nov. '55	479	2,045	95	1,724	0.84	18.06
1100(b)	Oct. '56	500	1,270	83	1,190	0.94	14.27
1150	July '54	444	2,710	158	3,155	1.16	19.87
1200	Nov. '56	500	1,265	95	1,935	1.53	20.30
1500(b)	Dec. '55	479	1,306	91	1,359	1.03	14.93
1600	Aug. '55	478	1,503	106	2,384	1.12	21.22
1600	May '57	503	1,313	100	2,453	1.87	24.59

(a) Intermediate K-9 School (b) Jr. or Sr. High School

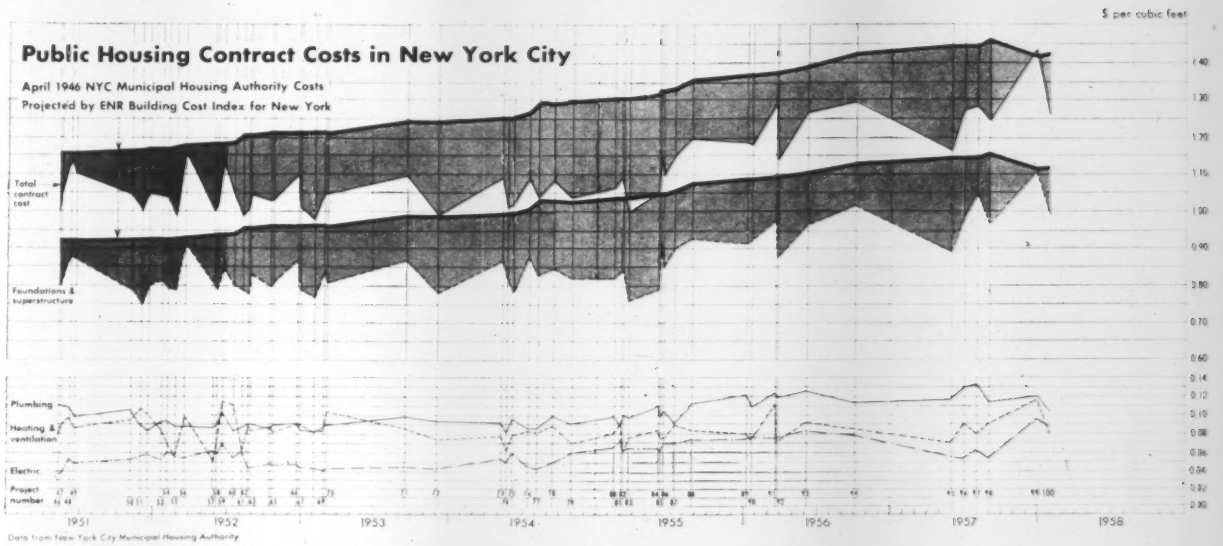
New Senior High Schools

Capacity No. pupils	Date Built	ENR Bldg Cost Index	Size pupil cf	Size pupil sf	Cost adjusted to Feb. '58 per pupil	per cf	per sf
400	July '51	400	1,725		$2,535	$1.47	
400	May '55	463	2,524	167	2,651	1.05	$15.92
420	Nov. '50	390	1,986	124	2,342	1.19	17.57
550	Apr. '50	363	1,483	93	2,007	1.05	15.79
600	Apr. '54	437		115	2,053		17.92
600	June '55	465	2,102	138	2,351	1.12	17.07
600	Aug. '54	456	1,865	139	2,312	1.00	14.15
630	Oct. '50	397	795	62	1,235	1.46	18.90
650	Sept. '50	393	3,948		3,835	0.97	
700	Aug. '55	478	1,729	117	1,787	1.00	15.29
750	June '55	465	3,002	134	2,537	0.84	18.89
750	Jan. '56	480	2,218	131	2,572	1.17	19.59
750	Mar. '56	483	1,833	104	1,923	1.05	18.42
750	Sept. '56	500	1,141	85	1,363	1.19	16.05
800	Apr. '52	408	1,426	82	1,891	1.38	23.05
810	Mar. '55	460	2,101	126	1,962	0.93	15.55
827	Apr. '56	486	1,520	101	1,323	0.87	12.69
850	Dec. '55	479	2,146	112	1,789	0.82	15.81
900	Mar. '55	459	1,683	110	1,891	1.14	17.20
940	Feb. '50	356	1,457	92	1,674	1.09	18.19
1000	May '53	426	1,410	94	1,611	1.14	17.44
1000	Oct. '54	456	1,306	92	1,856	1.31	20.18
1000	Aug. '55	478	2,070	125	2,487	1.76	19.43
1000	July '56	489	1,742	106	2,137	1.22	20.06
1080	Sept. '55	479	2,223	105	1,874	0.84	17.94
1100	Sept. '55	479	1,737	114	2,078	1.20	18.28
1193	July '54	444	1,321	85	1,779	1.37	20.80
1200	Feb. '50	356	1,895	124	2,557	1.28	18.67
1200	June '54	440	2,093	118	2,340	1.07	19.77
1200	Oct. '54	456	1,733	95	1,461	0.84	15.37
1200	Aug. '56	491	1,756	111	2,293	1.30	20.57
1450	Sept. '54	454	1,541	118	1,989	1.28	16.82

. . . And What New York Schools Cost



IN NEW YORK STATE costs of K-6 elementary schools continued to rise moderately. For more detail and costs of secondary, 7-12 schools see the table on facing page.



Housing . . .

The sharp rise to $1.4341 in cube costs for the Redfern Houses addition by the New York City Housing Authority in the fourth quarter of 1957 dropped back to $1.263 per cu ft for the Sen. Taft Houses let in the first quarter of 1958. But cost per construction room moved up to $2,705.31 for Redfern and to $2,897.26 for Sen. Taft Houses, from $2,502 in the 3rd quarter for Louis Heaton Pink Houses.

Electrical costs at Redfern were 59% higher per cube than the previous contract for Louis Heaton Pink Houses and the Taft electrical costs were up 45%. Plumbing, up only 7% for Redfern, was down 7% for Taft. Heating was up 23% at Redfern but 15% lower per cu ft for Taft. Foundation and superstructure cube costs were 19% higher at Redfern, 7% higher at the Sen. Taft Houses.

Public Housing Unit Prices—1957-58

Awards by New York City Housing Authority

Project Number		Second Quarter 1957 (95)		Third Quarter 1957 (97)		4th Quarter 1957 (99)	1st Quarter 1958 (100)
Project		Castle Hill Houses	Jefferson Houses III*	Baruch Houses III*	Louis Heaton Pink Houses	Redfern Houses Addition	Sen. Taft Houses
Total constructed rooms	No.	8,761	2,980	2,700	6,352	734	3,198
Total apartments	No.	2,025	700	658	1,500	148	798
Rooms per apartment	Av. No.	4.33	4.26	4.10	4.23	4.96	4.01
Total cubage	Cu. ft.	19,247,987	5,909,373	5,264,205	13,316,063	1,384,635	7,337,776
Bid date		5-7-57	6-28-57	7-23-57	8-27-57	12-10-57	1-21-58
Cost per:							
Total contract		$21,556,064	$7,303,408	$6,658,912	$15,891,250*	$1,985,700	$9,265,452
Constructed room		2,460.46	2,450.81	2,466.26	2,501.77*	2,705.31	2,897.26
Apartment		10,644.97	10,433.44	10,119.93	10,594.17*	13,416.89	11,610.84
Cubic foot		1.1200	1.2359	1.2649	1.1934*	1.4341	1.263
Foundations & superstructures		16,900,324	5,678,632	5,196,075	12,335,800	1,526,000	7,268,855
Constructed room		1,929.04	1,905.58	1,924.47	1,942.04	2,079.02	2,272.93
Apartment		8,345.84	8,112.33	7,896.77	8,223.87	10,310.81	9,108.84
Cubic foot		0.8780	0.9610	0.9870	0.9265	1.1021	0.991
Heating and ventilation		1,378,000	552,576	440,000	1,259,800	161,750	589,800
Constructed room		157.29	185.43	162.96	198.33	220.36	184.43
Apartment		680.49	789.39	668.69	839.87	1,092.91	739.10
Cubic foot		0.0716	0.0935	0.0836	0.0946	0.1168	0.080
Electrical construction		1,048,740	314,300	327,800	797,000*	131,750	637,000
Constructed room		119.71	105.47	121.41	125.47*	179.50	199.19
Apartment		517.90	449.00	498.18	531.33*	890.20	798.25
Cubic foot		0.0545	0.0532	0.0623	0.0599*	0.0952	0.087
Plumbing		2,229,000	757,900	695,037	1,498,650	166,200	769,797
Constructed room		254.42	254.33	257.42	235.93	226.43	240.71
Apartment		1,100.74	1,082.72	1,056.29	999.09	1,122.97	964.65
Cubic foot		0.1158	0.1282	0.1320	0.1125	0.1200	0.105
Piling abnormal foundations		727,000	143,000	700,000	644,000	58,000	1,338,00

Schools . . .

The rise in elementary school costs in New York State, based on costs per square foot reported to the State Education Department, Division of School Buildings and Grounds, continues to hold below the rise in basic costs as measured by the ENR Building Cost Index. It is less also than the rise in building prices measured by the average of four contractor indexes. For example, the third quarter average actual cost reported was $18 per sq ft. This would have been $19.29 if it had gone up with the contractor price index and $20.88 if it had gone up with the ENR Building Cost Index. The fourth quarter average of $19 would have been $19.35 or $20.91 if it moved with the indexes.

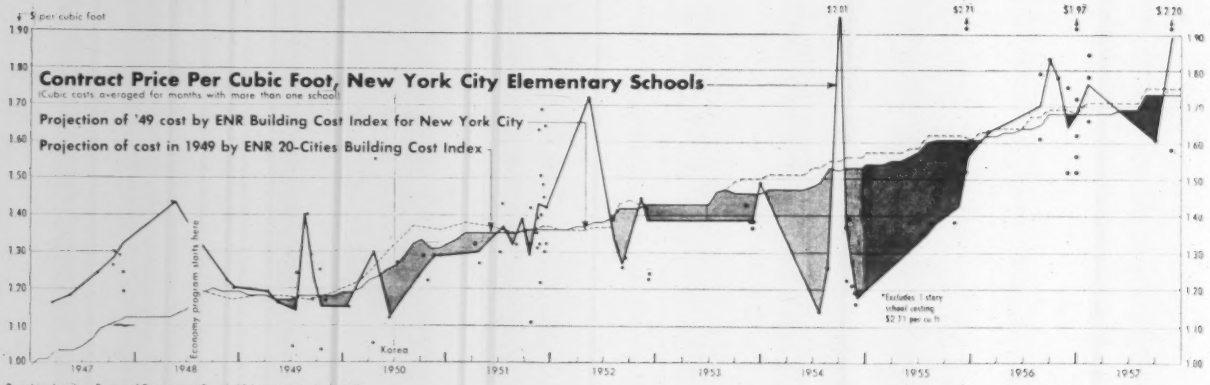
School Costs Per Square Foot in New York State

State Education Department, Division of School Buildings and Grounds

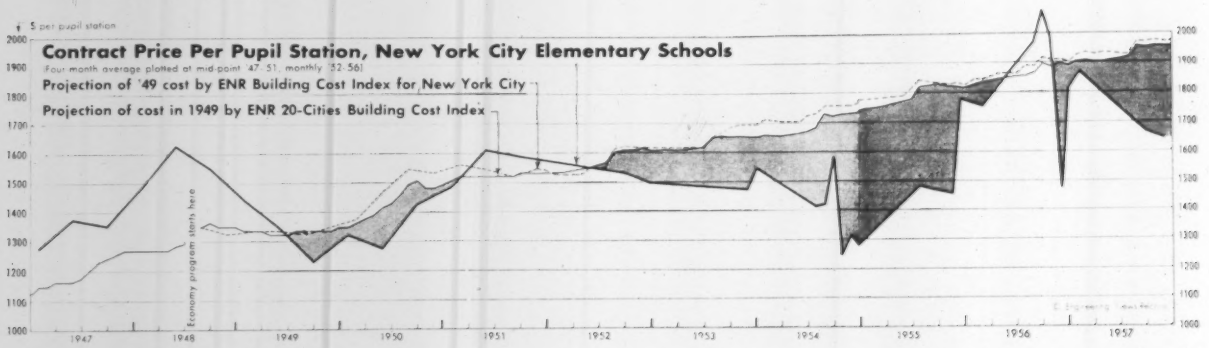
	No. of Schools K-6	Elementary, K-6 Dollars per sq ft for schools with . . .									No. of Schools 7-12	Secondary, 7-12 Dollars per sq ft		
		One Large Unit*			Two Large Units*			Three Large Units*						
	Total	Min	Med	Max	Min	Med	Max	Min	Med	Max	Total	Min	Med	Max
1949	29	$10.40	$14.00	$19.20	$12.00	$14.60	$18.70				4	$13.20	$13.55	$16.20
1955	52	11.75	16.40	23.60	11.90	15.70	20.25	$14.90	$14.90	$15.90	13	12.55	17.10	18.50
1956	53	12.60	17.85	23.80	13.25	17.65	21.10	16.50	16.80	17.10	7	15.40	18.15	20.90
1957	44	14.65	19.25	25.20	12.90	18.00	21.75	.....	18.70	.....	10	16.40	18.61	20.60
'55, Q1	17	13.60	16.40	17.35	12.70	14.53	15.90	.....	14.90	.....	4	12.55	15.15	17.50
Q2	17	11.75	15.83	19.90	11.90	15.70	17.20	.....	.....	.....	3	15.60	17.20	17.30
Q3	8	17.50	19.25	19.90	15.90	16.90	20.25	.....	.....	.....	4	15.30	16.40	18.50
Q4	12	15.50	16.95	23.60	.....	.....	.....	.....	15.90	.....	2	18.25	18.33	18.40
'56, Q1	11	14.95	15.10	18.40	14.45	16.80	18.50	.....	.....	.....	2	16.75	18.33	20.90
Q2	18	14.40	16.50	18.55	14.60	18.00	19.00	.....	17.10	.....	2	15.80	16.98	18.15
Q3	9	12.90	19.10	21.60	14.15	18.50	21.10	.....	16.50	.....	2	15.40	17.25	19.10
Q4	15	16.00	20.70	23.80	13.25	18.85	21.00	.....	.....	.....	1	.....	18.60	.....
'57, Q1	11	17.80	18.58	19.35	15.70	19.23	21.75	.....	18.20	.....	1	.....	18.51	.....
Q2	14	14.65	19.60	25.20	12.90	18.10	19.00	.....	.....	.....	5	18.70	19.35	20.00
Q3	11	18.60	19.15	19.40	14.40	17.78	18.40	.....	.....	.....	3	16.40	19.50	20.60
Q4	8	18.60	22.00	25.20	17.60	17.95	19.60	.....	.....	.....	1	.....	18.90	.....

*** Large Unit includes a general purpose room, gymnasium, auditorium, multi-purpose or other group activity room. These are costs based on the four contracts—general construction, plumbing, electrical, heating and ventilating. They include built-in features, but no movable furniture or equipment. Some minor site improvement may be included, but no major site work and no land costs.**

Unit Prices on New York City Schools



Based on data from Bureau of Construction, Board of Education, New York, N.Y.



Unit Prices of Schools Built in New York City — by Years

Elementary Schools

	no.	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity, pupil stas min	capacity, pupil stas aver	capacity, pupil stas max
1947	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,162	1,550
1948	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949	(12)	1.03	1.18	1.40	1,148	1,334	1,638	858	1,181	1,588
1950	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,036	1,581
1951	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310
1953	(6)	1.37	1.41	1.49	1,202	1,488	1,570	792	944	1,238
1954	(9)	1.14	1.33	2.01	1,216	1,354	1,580	302	1,073	1,292
1955	(10)	1.35	1.61	2.71	1,338	1,653	2,059	133	1,117	1,364
1956	(12)	1.52	1.69	1.97	1,467	1,811	2,361	842	1,244	1,631
1957	(6)	1.58	1.78	2.20	1,581	1,762	2,136	487	1,114	1,400

Junior High Schools

	no	per cu ft min	per cu ft aver	per cu ft max	per pupil sta min	per pupil sta aver	per pupil sta max	capacity, pupil stas min	capacity, pupil stas aver	capacity, pupil stas max
1947	(2)	$1.21	$1.23	$1.25	$1,270	$1,277	$1,284	1,810	2,068	2,326
1948	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949	(3)	0.99	1.09	1.26	1,261	1,380	1,553	1,518	1,819	1,998
1950	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951	(5)	1.32	1.36	1.38	1,408	1,511	1,645	1,558	1,842	2,020
1952	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056
1953	(7)	1.10	1.22	1.29	1,176	1,280	1,462	1,766	1,968	2,185
1954	(6)	1.10	1.23	1.30	1,237	1,322	1,517	1,694	1,969	2,136
1955	(11)	1.25	1.44	1.63	1,370	1,580	1,904	1,772	1,950	2,114
1956	(6)	1.49	1.64	2.02	1,580	1,711	1,895	1,764	1,959	2,166
1957	(2)	1.53	1.64	1.74	1,609	1,709	1,808	1,946	2,065	2,183

School Building Contract Unit Prices, New York City—1957

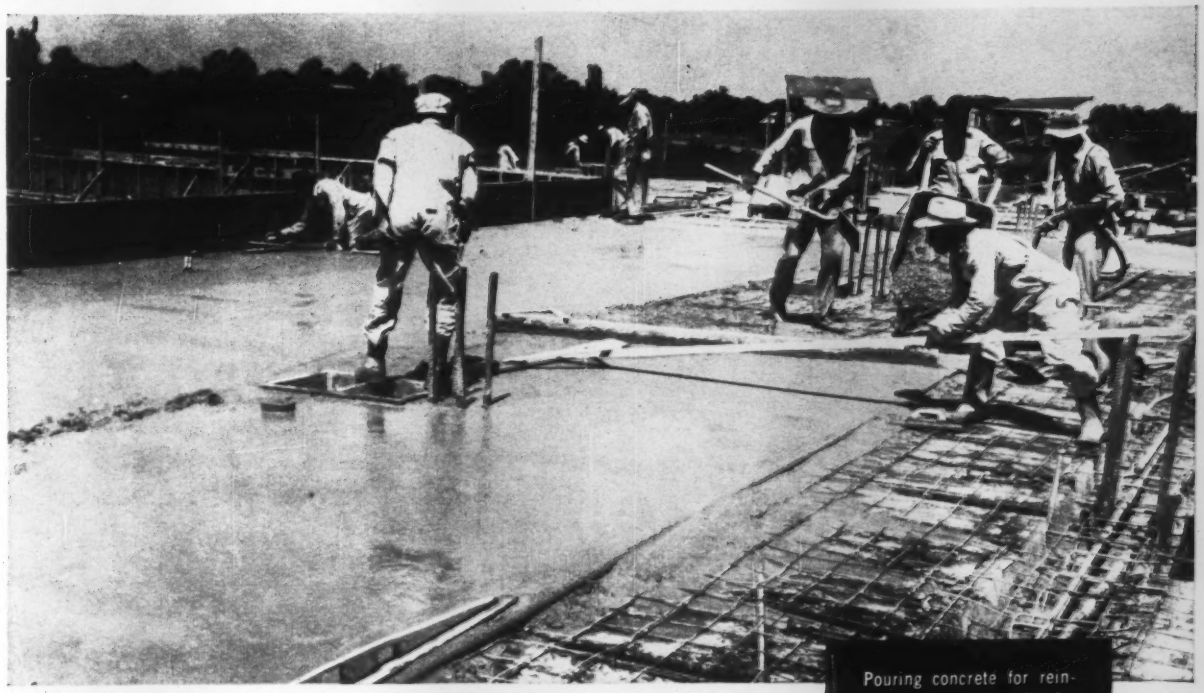
Bureau of Building Design and Construction, Board of Education, City of New York

No.	Size, min-aver-max pupil station	Large units	Min-aver-max COST per pupil station	Min-aver-max COST per cubic foot	Min-aver-max % of total bldg contract price* general constr %	heating %	plumbing %	electrical %
Elementary, New 3-Story								
5	1,075–1,239–1,400	Aud; gym; lunch-playrm	$1,581–1,772–2,136	$1.58–1.69–1.84	74.4-74.9-75.6	10.1-10.6-11.0	5.1-6.0-6.7	8.0-8.5-9.0
Elementary, New 2-Story								
1	487	Multi-purpose; lunch-playrm.	1,710	2.20	67.2	11.9	11.1	9.8
Elementary, Addition 2-Story								
	252	Classrooms only	1,138	1.98	78.7	11.0	3.8	6.5
Junior High, New 3-Story								
1	1,946	Aud; gym; cafeteria	1,609	1.53	71.2	11.0	5.3	11.9
1	2,183	Aud; gym; caf; branch library	1,808	1.74	72.9	11.3	5.6	10.2

*Excludes abnormal site costs

School costs per cu ft held or rose only a little in New York City in 1957. They show a small drop in per pupil costs. ELEMENTARY SCHOOL averages climbed to $1.78 per cu ft from $1.69 in 1956, while cost per pupil dropped to $1,762 from $1,811.

The JUNIOR HIGH SCHOOL costs held at $1.64 per cu ft, their average for 1956, while the cost per pupil receded slightly to $1,709 from $1,711 in 1956.



Pouring concrete for reinforced second floor slab for Houston Hospital and Dyer's Clinic, Houston, Mississippi.

ARCHITECT:
Ellerbe & Company
St. Paul, Minn.

ASSOC. ARCHITECT:
William I. Rosamond
Columbus, Miss.

CONTRACTOR:
G & K Construction Co., Inc.
Pascagoula, Miss.

DEALER:
Dendy Lumber Company
Houston, Miss.

Lehigh Mortar Cement contributed to good-looking exterior masonry in this new three-story, 65-bed Mississippi hospital.

Mississippi Contractor meets tight schedule with . . .

LEHIGH EARLY STRENGTH CEMENT

To meet the completion date requirement of their contract, the G & K Construction Company, Inc., set up a tight working schedule for this job at Houston, Mississippi.

By using Lehigh Early Strength Cement in the columns, floors and roof, they were able to keep within the time limit, yet avoid doubling form costs.

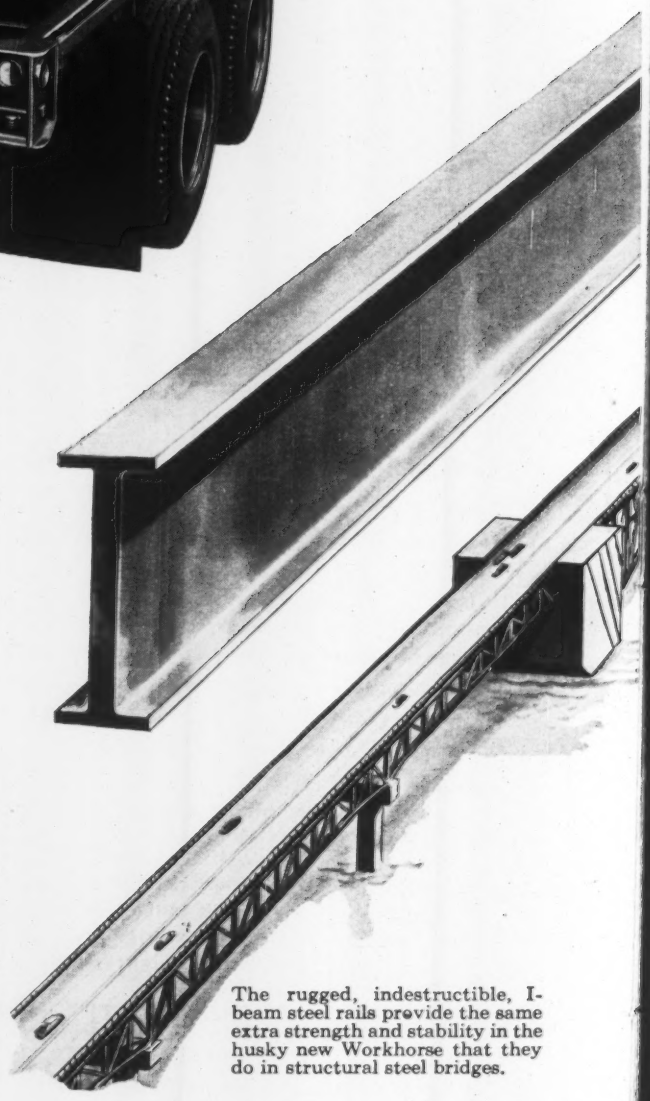
As a result, they saved $5500 on form and general overhead costs, and 35 to 40 days construction time.

That's why we say "Somewhere on nearly every job, Lehigh Early Strength Cement will save you time and money."

- LEHIGH PORTLAND CEMENT
- LEHIGH EARLY STRENGTH CEMENT
- LEHIGH MORTAR CEMENT
- LEHIGH AIR-ENTRAINING CEMENT

LEHIGH PORTLAND CEMENT CO.
ALLENTOWN, PA.

The deep, full-length, girder type, I-beam rails and full-width, I-beam crossmembers are welded together for the same type of powerful structural steel construction used in many modern bridges.

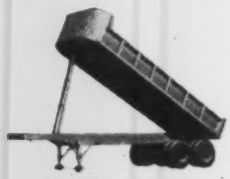


FRUEHAUF TRAILERS

The rugged, indestructible, I-beam steel rails provide the same extra strength and stability in the husky new Workhorse that they do in structural steel bridges.

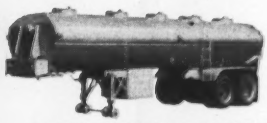
FRUEHAUF BUILDS THE HAULING INDUSTRY'S BIGGEST LINE OF RUGGED CONSTRUCTION TRAILERS!

CABLE DUMPS



HOIST DUMPS

CARRYALLS



BULK CEMENT TANKS

The longitudinal steel I-beam rails actually become part of the Trailer floor in the new Workhorse Platform, and directly support lift trucks and loads!

The New Fruehauf Workhorse Platform Is Tough As A Bridge!

. . . yet saves up to 1,200 pounds in weight

The new Fruehauf Workhorse Platform is built for strength, lasting power, and big weight savings.

Its deep, deep 19½″ I-beam channels directly support loads, lift trucks, and all the forces that tax and strain platform strength.

They do the job, and last, because they're extra deep, continuous, forged of the toughest low alloy, high-tensile steel.

Rugged, full-width I-beam crossmembers at 18″ intervals increase rigidity and carrying capacity. Everything about the Workhorse is designed for top payloads and hard work.

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COMPANY_____

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CITY_____ STATE_____

Where The Building Dollar Goes

Unit and Ratio Costs Supplied through the Courtesy of Rea Construction Co., Pittsburgh, Pa., Thompson & Street Company, Atlanta, Ga., F. A. Wilhelm Construction Co., Inc., Indianapolis, Ind., and Western-Knapp Engineering Co., San Francisco, Calif.

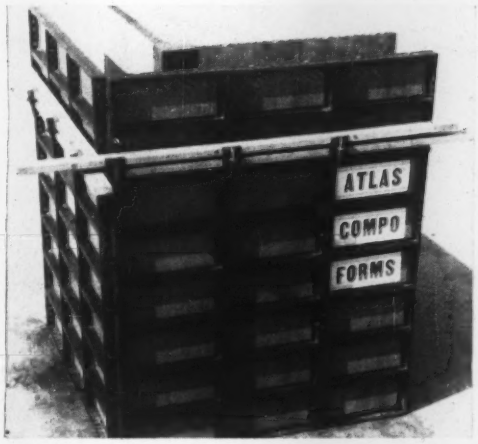
TYPE OF: Building (purpose or product)	Hospital	2 Dormitories	School	School	Office Bldg.	Mfg & Office	Mill Bldg	Buildings
Construction: frame	Steel	Concrete	Steel-Conc	Steel-Conc	Reinf Concrete	Stl & Reinf Conc	Wood	Steel
outside walls	Brick & Stone	Brick & Metal	Brick	Brick	Marble & Brick	Met & Precast Conc	Cor Siding	Cor Siding
Date Construction started	Dec. 1957		Jan. 1, 1956	Sept. 1, 1957	Dec., 1953	Apr. 1 1957	Sept. 1956	Oct., 1956
Location, city	Indianapolis, Ind.	Rensselaer, Ind.	Pittsburgh, Pa.	New Brighton, Pa.	Atlanta, Ga.	Orlando, Fla	Washington	Wyoming
SIZE OF BUILDING: Height, stories	3	3	3	2	9	1 & 2	40 ft	36 ft
Floor area, sq ft	41,755 sf	.....	152,000 sf	77,900 sf	479,000 sf	528,000 sf	3,640 sf	2,400 ft
Volume, cu ft	638,620 cf	.....	1,965,100 cf	1,236,500 cf	7,130,000 cf	10,590,000 cf	145,600 cf	86,400 cf
% air conditioned	100%	0%	.....	....	100%	100%	0%	0%
RANGE OF COST of this type of building					Actual	Actual	Actual Min	Aver Max
Cost, $ per sq ft	.....	.....	.....	.....	$18.04	$11.76	$137.93 $100	$125 $150
Cost, $ per cu ft	.....	.....	.....	.....	1.214	0.586	3.83	....
Unit of Capacity	.....	.....	.....	.....	.....	.....	440 t/24 hr	487 t/24 hr ....
ENR BUILDING COST INDEX	516	.....	480	516	435	501	500	500

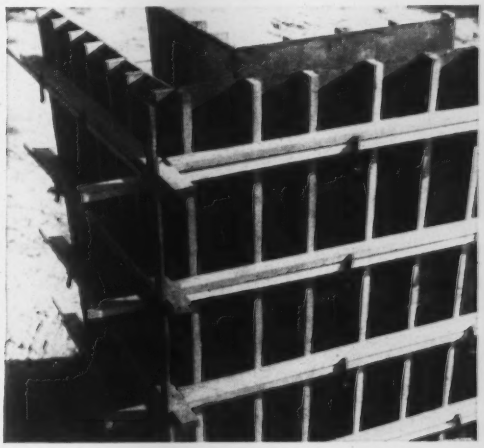
PRINCIPAL ITEMS OF COST		%		%		%		%	% of Total Costs	%	%	%
Excavation & Site	$16,556	3.03	$7,884	2.00	$211,250	13.08	$67,650	7.05	2.63	Sep Cont	04.2	03.2
Foundations	36,000	6.59	20,000	5.07	158,250	9.80	142,000	14.79	incl in Exc	0.9	17.0	17.9
Structural Frame	91,000	16.67	50,225	12.73	243,000	15.04	130,000	13.54	16.90	Sep Cont	49.9	39.3
Cement Finish Work	3,505	0.64	4,100	1.04	13,600	0.84	6,000	0.62	incl in Fdrs	20.0	....	....
Exterior Masonry	83,000	15.20	25,100	6.36	140,400	8.69	200,000	20.83	11.39	0.2	....	....
Metal Wall Panels	40,215 d	7.36	66,000 d	16.73						1.8	....	....
Interior Partitions	40,743	7.46	49,627	12.57	167,450	10.37	16,500	1.72	4.06	2.8	....	....
Carpentry & Millwork	47,556	8.71	21,128	5.35	51,500	3.19	55,000	5.73	4.65	0.3	15.8	22.8
Sash & Glazing	11,099 e	2.03	12,276 e	3.11	92,200	5.71	40,000	4.17	1.77	0.6	....	....
Doors	4,650 a	0.85	7,113	1.80	22,000	1.36	15,000	1.56	0.97	1.6	1.0	0.8
Roofing	9,540 b	1.75	7,673	1.94	51,600	3.19	80,000	8.33	0.66	1.5	4.8	2.8
Insulation	in roofing		in roofing		in roofing		in roofing		0.08	....	....	0.9
Water-and Dampproofing	308	0.06	762	0.20	7,000	0.46	1,000	0.10	0.58	....	....	....
Metal Lath, Furring, & Plastering	67,043	12.28	50,079	12.69	91,000	5.63	25,000	2.60	2.14	1.6	....	....
Hollow Metal Work	in doors		in doors		21,000	1.30	9,500	0.99	0.48	0.6	....	....
Misc Iron & Ornamental Metal	7,516	1.38	20,092	5.09	40,000	2.47	32,000	3.33	2.54	1.8	1.0	0.8
Tile, Terrazzo, & Marble	33,838	6.20	7,246	1.84	61,000	3.78	21,000	2.20	7.72	1.3	....	....
Floor Covering	8,687	1.59	9,807	2.48	32,000	1.98	15,000	1.56	1.45	0.8	0.4	0.8
Painting	14,353	2.63	11,062	2.80	20,000	1.24	27,000	2.81	1.20	0.9	0.2	4.2
Finish Hardware	14,000	2.56	9,625	2.44	18,000	1.11	12,500	1.30	1.04	0.5	0.5	0.3
Acoustical Ceilings	16,408	3.01	11,501	2.91	1,000	0.06	15,000	1.56	1.59	1.1	....	....
Plumbing	sub	....	sub	....	.....	....	.....	....	17.83	33.0	1.9	1.1
Heat, Ventil, & Air Conditioning	sub	....	sub	....	.....	....	.....	....	in plumb	in plumb	3.3	5.1
Electrical Work & Light Fixtures	sub	....	sub	....	.....	....	.....	....	12.22	24.6	....	....
Elevators	sub	....	.....	....	.....	....	.....	....	6.59	0.3	....	....
Power Plant	existing	....	existing	....	.....	....	.....	....	....	....	....	....
Intercom Systems & Television	in elec	....	in elec	....	.....	....	.....	....	....	0.4	....	....
Equip: (mach tools, process equip, etc.) kitchen, opertg rm, gym, stage, etc	.....	....	.....	....	173,000	10.7	50,000	5.21	.....	2.6 c	....	....
Bulletin board & display cases	.....	....	3,369	0.85	.....	....	.....	....	.....	....	....	....
Miscellaneous	.....	....	.....	....	.....	....	.....	....	1.51	0.8	....	....

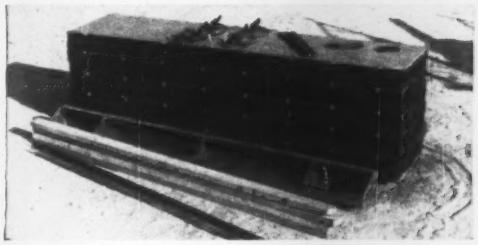
a hollow metal & frames b Roofing & sheet metal c Kitchen equip. d includes sash e glazing only

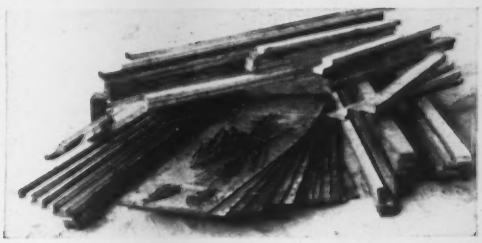
This is the seventh in this series of building cost analyses. For number 6 see ENR, Oct. 17, 1957, p. 280-281

CASH GUARANTEE OF 15% TO 25% FORM LABOR SAVINGS









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These photos show one reason why Compo Forms enable us to give a CASH GUARANTEE of 15% to 25% labor cost reduction in forming concrete. Ask us to show you the other reasons why Compo Forms save. Even if you have developed your own forming system, or have used other patent forms, we still can save you money. Our system and service are unique.

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A CASH GUARANTEE OF LABOR COST reduction does interest us. Tell us more.

Name_____ Position_____

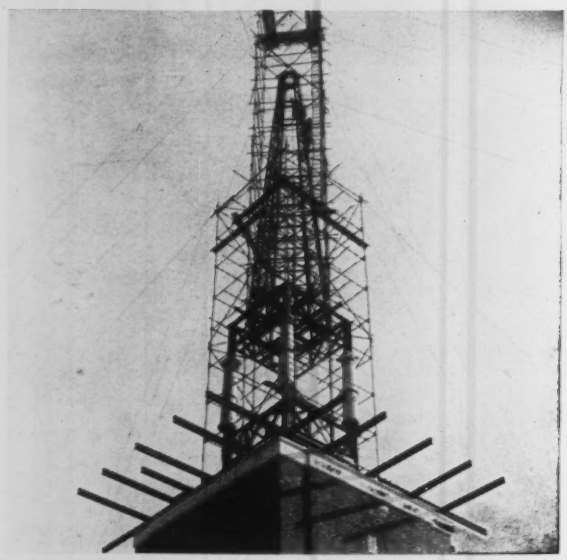
Company_____

Address_____

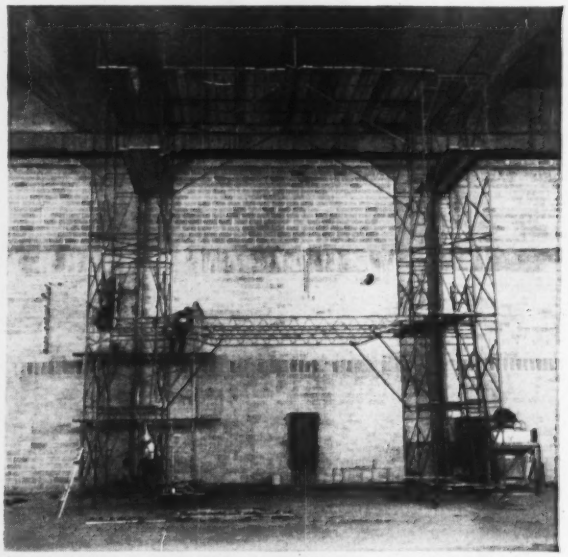
_____ Tel. No._____

SUPPORTS 270′ CONCRETE CANOPY— Handling form work and providing support for circular concrete canopy around the new Municipal Auditorium, Austin, Texas, is simplified for contractor, J. J. Stokes Construction Co., by the use of modern prefab "Trouble Saver"® Steel Shoring. 580 frames are quickly and easily assembled to provide the shoring needed. Planking laid across the tops of frames also provides working plattorms. By using this shoring technique the contractor cuts forming costs all along the line. "Trouble Saver" frames are 5′ wide and range in height from 3′ to 10′, providing broad application variations to meet any scaffolding or shoring job for efficient, lower cost construction.

Scaffolding Methods . . . by Patent Scaffolding Co.



TWO-STAGE SCAFFOLDING— Contractor, Miller Davis Co., uses 3870′ of "TubeLox"® Scaffolding for building a steel roof on this 215′ spire. After upper portion is done, scaffold is dismantled and re-erected on the I-beams for heavier lower work. New Goodrich Mem. Chapel, Albion, Mich. Made with only four basic parts, this scaffolding is erected rapidly to conform to any shape, size or contour. Variable tube lengths, from 6′ to 20′, and adjustable couplers assemble to meet job conditions.



ELECTRICIANS' ROLLING TANDEM SCAFFOLD—These two towers are each made of five sections of 6′6″ "Trouble Saver" Scaffolding frames set on casters, truss-joined at two points and braced at the bottom with "TubeLox" Scaffolding. They permit the contractor, J. Livingston & Co., to roll along 33′6″-high for electrical work on hangar #12, Idlewild Airport, N. Y. C. "Trouble Saver" Scaffolding accessories permit unlimited scaffolding design and use.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

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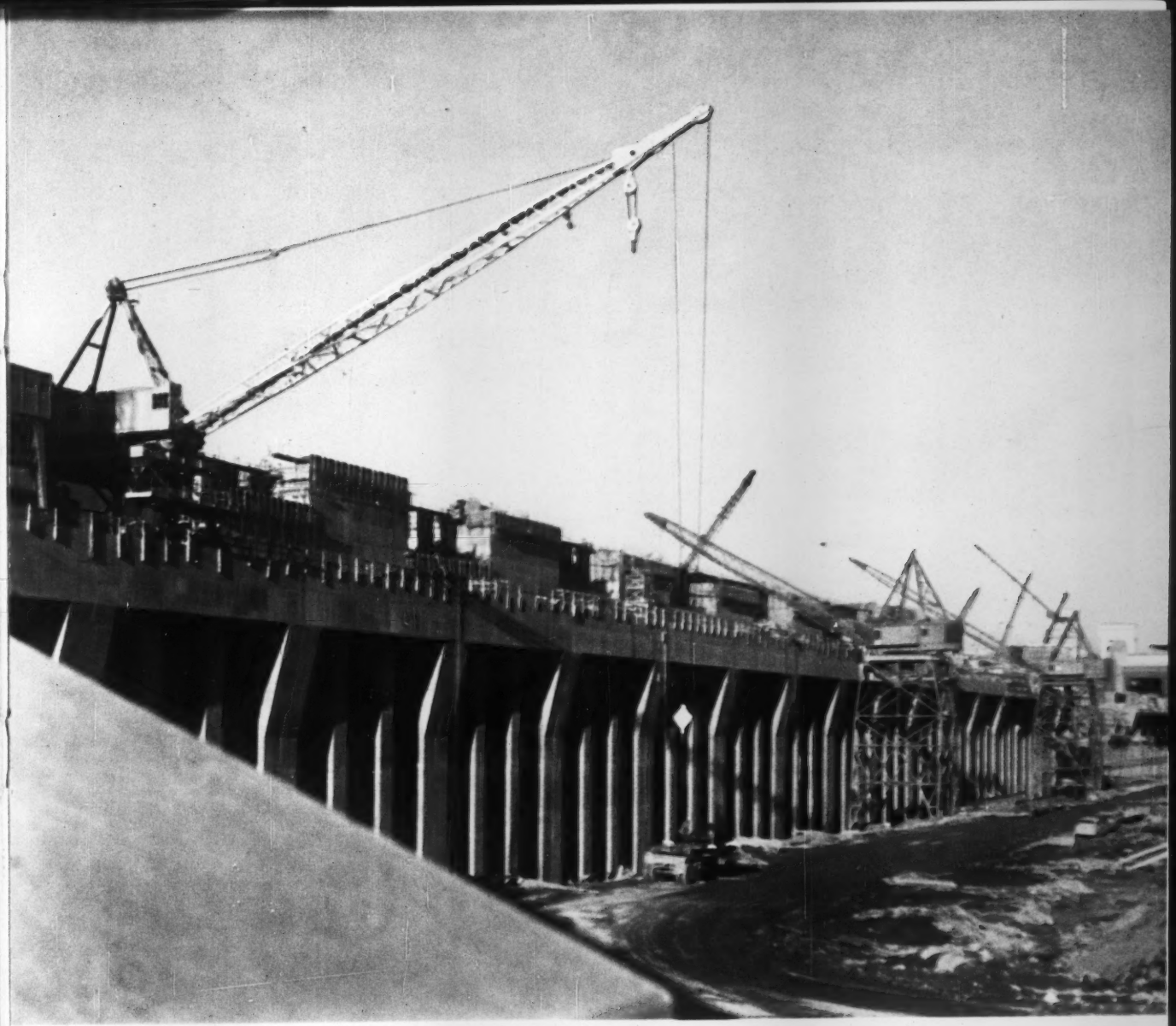

$900,000,000
St. Lawrence Power-Seaway Project proves it again . . .

AGGREGATES FOR LONG SAULT DAM, and the Massena Intake, Iroquois and St. Lawrence Power Dams, are mined and crushed at its Norfolk, N.Y. quarry by Tecon Corporation, Dallas, Texas. Tecon uses Gulf lubricants and fuels for all equipment.

ON-THE-SPOT GULF SERVICE is provided Jack and Jim Maser, excavators from Lancaster, Pa. At left, the late Charles Reynolds, Maser Project Superintendent, compliments Gulf Jobber John Pellegrino on his prompt deliveries. Jack Nicholson, Gulf Sales Engineer, is at right.

...You can depend on Gulf

The St. Lawrence Power-Seaway Project is one of the biggest construction jobs ever tackled by man. It calls for 15,000 workers and $70 million worth of equipment. They'll move 180,000,000 tons of dirt, mud and rock. Create a 70-square-mile lake where cows once grazed. Build a power dam second only to the Grand Coulee in size.

Men and machines often work with a slick but glue-like gumbo underfoot. Temperatures sometimes drop to 50° below. Dragline, crane, shovel, hydraulic jack or drill—dozer, grader, truck, locomotive or tug—no matter what the equipment, Gulf products and service help keep it on the go, three shifts a day, six days a week.

Gulf makes a petroleum product to drive any internal combustion engine—or to keep any powered equipment rolling. You'll find the cost reasonable, the savings in maintenance expense frequently substantial. In addition, a Gulf Sales Engineer is always available, free of charge, to help you with lubrication and fuel problems. All it takes is a phone call to your nearest Gulf office.

LONG SAULT DAM, a $29 million concrete gravity spillway structure, is one of the St. Lawrence Power Projects being rushed to completion with the help of Gulf petroleum products and service. When finished, it will be 2,960 feet long on a curved axis having a radius of 1,600 feet and will require 685,000 cubic yards of concrete.

when the going's tough!

CONTRACT FOR DREDGING SOUTH CORNWALL CHANNEL was awarded to S. J. Groves & Sons Company, of New York City. Groves estimates it will have to remove about 1,800,000 cubic yards. Tug and dragline use Gulf diesel fuel.

◀ FUEL FOR GROVES' EQUIPMENT is provided from tanks that hold 12,000 gallons of Gulf diesel fuel and 4,000 gallons of Good Gulf Gasoline.

HAULING PILING FROM MASSENA INTAKE, one of the numerous trucking assignments of McConville, Inc., of Ogdensburg, N.Y. McConville is another of the many contractors on the St. Lawrence Power Project who knows he can count on Gulf performance and service.

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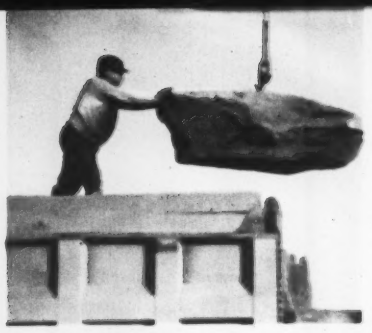
HUGE BLOCKS are used to line entry to Grass River Lock. Blocks came from stone quarry of Barrett Division of Allied Chemical and Dye Corporation, another Gulf customer.

SPECIAL PIN (eye and wedge) is driven into hole, hoisted by single cable to load truck. Barrett finds this device permits quicker, safer loading.



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GULF

How to Get Unit Prices on Buildings

Ralph Birchard
Chief, Construction Department
Rader & Associates
Miami, Florida

Unit prices on the many and diverse elements of building construction are often hard to come by because, to contractors who know them best, they represent a big investment which they resist giving away.

On the other hand, many contractors, as part of their public relations and new business procurement efforts, do supply prices to pre-contract estimators.

In any event, unit prices are essential to engineers, architects and quantity surveyors for the more accurate and precise cost estimating that enables owners to arrange their financing without getting into embarrassing money shortages or a costly surplus. Moreover, even the best unit prices vary with change in site, business conditions, building design and geographical location, so that a continuing supply is necessary.

Among the methods used to assure such a supply of unit prices are these:

1. Price materials, labor, equipment use, and add estimated mark-up.
2. Require in the contract that the contractor submit unit prices as a basis for monthly progress payments.
3. Ask friendly contractors to supply the data as needed.
4. On private work, bring the contractor into a planning team to advise on costs and methods from the start.

• **Mark-up**—For pricing items in the quantity takeoff, increasing numbers of unit price "handbooks" or "pricing manuals" are available, but these are of necessity based on averages, which have their limitations. Also, labor and material pricing from local rates can be followed, but here, as with the handbooks, the "mark-up" is the big question mark. This mark-up—a percentage of Direct Cost which the contractor must add to cover Overhead and Profit—is the subject of endless debate and speculation, but on buildings that cost up to $100,000 a mark-up of 25 to 30% is considered normal.

This mark-up includes overtime, social security taxes, insurance, bonds, permits and the costs of procurement, warehousing, general supervision, business-getting and contingencies. The better the set of contract documents—that is, the more explicit and complete the drawings and specifications—the less will be the allowance for contingencies. Some estimators include overtime, social security taxes and insurance as Labor, thus increasing the Direct Cost and reducing the Overhead.

Percentage of the mark-up also will vary inversely with the amount of subcontracting. Where 80% of the work is subcontracted, the subcontractors have, theoretically, absorbed 80% of the Indirect Costs (Overhead and Profit). In practice, however, the prime contractor usually anticipates a considerable overhead cost for coordinating the work. A mark-up of 15% on subcontractors' bids is not uncommon.

The mark-up decreases, percentage wise, as the value of the building increases. Partly, this is a true reflection of costs. There are certain costs—such as those of maintaining an office, a yard and a business-getting organization—which are relatively fixed and must be prorated. Hence the percentage on a million dollar contract is less than on a one hundred thousand dollar contract.

Partly, this variation in mark-up is also due to the tendency of contractors to think of profit in terms of time—usually the calendar year. If the profit goal is $50,000 it could be achieved by a profit of 5% on a single contract for $1,000,000; or by a profit of 10% on three contracts totalling $500,000.

• **Unit prices**—When all bidders are estimating from the same quantity survey their unit prices, presumably based on their experience records, measure the efficiency of their operations. These records are quite commonly regarded as the contractor's stock-in-trade and hence are carefully guarded secrets. How, then, can the estimator for the architect or owner or municipality or government agency establish accurate unit prices for the building components? These are needed as a basis for progress payments as well as for cost estimates on which financing is based.

One method in use is to require from the contractor breakdowns of all lump sum items. This is done by inserting in the General Conditions of the specifications a paragraph like this:

Within twenty days after award of contract the contractor shall submit to the Engineer on forms supplied by the Engineer, in triplicate, a breakdown of all lump sum items in the contract. This breakdown shall be subject to approval by the Engineer and when so approved shall become the basis for determining progress payments and for negotiation of change orders.

The need for such a breakdown in preparing monthly payment estimates is obvious. To be at all accurate they must be based on ascertainable quantities of work accomplished at established unit prices. The breakdown establishes the unit prices in this contract. It also provides an excellent check on both the quantities and prices used in preparing the estimate for comparison with bids, and helps to establish accurate unit prices for future estimates.

The requirement that breakdowns must be approved is intended to prevent unbalancing—overstatement of early pay items such as earthwork and concrete, with a corresponding understatement or omission of late pay items such as floor finishes and painting.

The breakdown form supplied by the architect should, in general, follow the items in the estimate (with quantities to be filled in by the contractor) but should not be so elaborate and detailed as to work a hardship on the contractor.

When the Corps of Engineers was constructing some 35 Veterans Administration hospitals it required breakdowns per linear foot of all sizes of plumbing and heating piping and electrical conduit and all types and sizes of fittings. These were stubbornly resisted by contractors, and were so obviously unwarranted that they were not enforced by the officials in charge of construction. Unit prices in the breakdowns submitted varied so widely that it was clear they bore, in many instances, little relation to actual costs. Hence they proved worthless as a source of unit costs for estimating.

Breakdowns on more recent Corps of Engineers and Air Force work have improved considerably. Those for the buildings at a large project now under construction appear to reflect quite accurately the true costs of the various building components.

Items which recur constantly in building construction are shown in the accompanying table, also unit prices reported by contractors. These, of course, include overhead and profit. They are prices effective in the 3rd quarter of 1956. The ENR Building Cost Index for the same date is 493, 1913 = 100.

Prices for one building, the largest and costliest (Column 4), are consistently higher than for the others. Separate contracts were let for founda-

Area Cost Indexes, October, 1957—Denver=100

	New York	Cleveland	Chicago	Denver	New Orleans	Atlanta
Labor Index:	128	116	115	100	90	92
Material Index:	114	107	102	100	105	98
Construction Cost Index:	121	111	108	100	97	95

tions and structural steel. Contract for the rest of this monumental structure housing classrooms and laboratories called for completion of $19.4 million worth of work in 20 months, a very high rate of placement. So these unit prices probably include abnormally high allowances for overtime and contingencies.

Unit prices for some items are fairly consistent while others vary widely among the different contracts. Concrete costs in Columns 9 and 10 may have been somewhat overstated.

Averages shown in Column 13 assume an average mark-up of 26.5%. These divided by 1.265 give the cost-to-contractor (exclusive of overhead and profit) as shown in Column 14.

Completion time for most of these buildings is less than normal. On the other hand they are not in the highest cost area.

• **Area cost variations**—When an estimator in Chicago must make a preliminary estimate for a building in Denver he can do so with reasonable accuracy by applying a factor. Using, somewhat arbitrarily, the hourly rates for four categories of building labor and ten commonly used materials as reported in ENGINEERING NEWS-RECORD for Oct 17, 1957 the following index shows how wide these variations are.

Costs of exterior walls or "skins" of glass in extruded aluminum framing in three large buildings with vitreous coated glass spandrels and ¼ in. heat resistant plate glass, averaged per sq ft:

Extruded aluminum framing	$6.75
Glass	2.85
Exterior Wall	$9.60

Unit Prices of Building Components

From Contractors' Breakdowns Effective 3rd Quarter, 1956 ENR Building Costs

1 Item No	2 Building Type: Approximate Cost: Item Designation	3 Unit	4 Academic $21,900,000 Unit Price	5 Quarters $15,250,000 Unit Price	6 Dining Hall $3,950,000 Unit Price	7 Phys. Educ. $7,700,000 Unit Price	8 Adminis-tration $2,850,000 Unit Price	9 Dormi-tories $776,000 Unit Price	10 Gym-nasium $613,000 Unit Price	11 Group H.Q. $633,000 Unit Price	12 Telephone $160,000 Unit Price	13 Average Unit Price	14 Direct Cost Unit Price
1	**Concrete Work:**												
	a Concrete only, in place:												
	(1) Footings	CY	$22.50	$17.58	$16.73	$24.00	$24.00	$50.00	$48.67	$22.00		$28.18	$22.28
	(2) Found. Walls, Grade Beams	CY	24.50	17.58	20.72	24.00	24.00	50.00	48.67	25.00	$45.00	31.05	24.54
	(3) Structural Cols, Bms, Slabs	CY	29.00	19.42	19.52	23.00	24.00	55.00	40.00	26.00	43.68	31.07	24.56
	(4) Slabs on Grade	CY	22.50	19.65	20.97	22.00	22.00	40.00	30.00	28.00	30.00	26.12	20.65
	b Forms												
	(1) Wood	SF	1.00	0.61	0.55	0.80	0.70	0.55	0.71	0.60	0.50	0.67	0.53
	(2) Metal Pan	SF	0.60	0.61	0.52	0.85	0.72	....	....	0.45	0.67	0.63	0.50
	c Reinforcing Steel												
	(1) Bars	LB	0.145	0.139	0.125	0.115	0.14	0.138	0.179	0.13	0.175	0.143	0.113
	(2) Mesh	SF	0.08	0.072	0.088	0.05	0.09	0.10	0.15	0.07	0.15	0.094	0.074
	d Finish	SF	0.12	0.04	0.053	0.18	0.25	0.10	0.15	0.19	0.178	0.14	0.111
2	**Masonry:**												
	a 4" Concrete Block	SF	0.60	1.03	0.71	0.80	....	1.10	0.80	0.65	0.60	0.79	0.62
	b 6" Concrete Block	SF	0.75	1.19	0.78	0.90	....	....	0.90	0.75	0.62	0.84	0.66
	c 8" Concrete Block	SF	0.85	1.29	0.90	1.10	1.00	....	1.00	....	....	1.02	0.81
	d 4" G.S.U.—1 Face	SF	....	2.58	2.76	1.95	1.80	1.32	1.62	1.95	1.00	1.87	1.48
	e Marble—2" Ozark	SF	5.00	....	....	4.41	....	....	....	....	....	4.70	3.72
3	**Plastering:**												
	a Metal Lath on Masonry	SY	4.25	3.36	3.05	3.00	3.20	3.00	....	5.28	....	3.59	2.84
	b Ceiling, incl suspension	SY	6.50	4.89	6.10	8.75	7.50	10.00	6.30	7.28	3.38	6.74	5.33
	c Fireproof—vermiculite	SY	15.00	....	....	25.00	18.00	....	....	....	....	19.33	15.28
	d Steel Stud Partition—2 sides	SY	6.50	6.60	....	15.00	10.00	11.50	....	7.78	....	9.58	7.57
4	**Metal Work:**												
	a Aluminum Wall Framing	SF	8.50	5.62	....	6.00	....	....	....	....	....	6.71	5.30
	b Aluminum Column Jackets	SF	7.00	3.59	....	10.00	....	....	....	....	....	6.86	5.42
	c Aluminum Louvers	SF	7.00	7.50	6.32	14.00	....	....	....	....	....	8.70	6.88
	d Miscellaneous Steel	LB	1.00	0.55	0.39	0.42	0.75	0.39	0.37	0.39	0.42	0.52	0.41
	e Stainless Steel	LB	....	2.50	2.42	1.05	....	....	....	....	....	2.00	1.58
	f Sheet Metal—Galv. Steel	SF	0.75	0.70	....	1.50	....	....	....	0.80	....	0.94	0.74
	g Sheet Metal—Lead Coated Copper	SF	1.00	0.70	1.80	2.00	1.20	2.00	1.50	1.70	3.00	1.66	1.31
	h Steel Roof Deck	SF	....	....	0.39	0.62	....	....	....	0.31	....	0.44	0.35
5	**Glass:**												
	a ¼" Polished Plate	SF	1.60	1.11	1.49	1.50	....	....	....	1.59	2.00	1.55	1.23
	b ¼" Heat Absorbing Plate	SF	3.40	2.17	....	2.00	2.50	1.75	2.50	....	3.00	2.47	1.95
	c Vitreous Coated (Spandrel)	SF	4.00	2.55	....	3.00	3.20	3.87	2.00	....	6.97	3.66	2.89
6	**Floor Finishes:**												
	a Ceramic Tile, unglazed	SF	1.80	1.60	1.61	1.72	....	1.50	1.50	2.26	1.50	1.69	1.34
	b Terrazzo	SF	2.00	2.00	1.13	....	....	....	....	....	....	1.71	1.35
	c Vinyl-Asbestos Tile ⅛"	SF	0.50	0.37	0.31	0.50	....	....	....	....	....	0.42	0.33
	d Asphalt Tile ⅛"	SF	....	....	....	....	....	0.37	0.55	0.29	....	0.40	0.32
	e Quarry Tile	SF	....	....	1.38	1.50	....	....	....	2.14	....	1.67	1.32
	f Hardwood	SF	0.50	....	....	1.00	....	....	1.12	....	....	0.87	0.69
7	**Wall & Ceiling Finishes:**												
	a Ceramic Tile, unglazed	SF	2.20	2.00	....	....	1.60	....	....	....	....	1.93	1.53
	b Acoustical, mineral tile	SF	0.50	0.67	....	0.55	0.80	....	....	0.68	....	0.64	0.51
	c Porcelain enamel steel panels	SF	3.25	1.40	3.50	....	....	....	....	4.32	....	3.12	2.47
	d Mosaic (Italian Tesserae)	SF	8.10	7.50	....	....	8.00	....	....	....	....	7.87	6.22
8	**Roofing & Waterproofing:**												
	a Built-up, 5-ply	SQ	40.00	21.00	25.70	25.00	24.00	35.00	30.50	....	23.50	28.09	22.05
	b Insulation—2" Rigid	SF	0.35	0.24	....	0.30	0.27	....	0.40	0.22	....	0.30	0.24
	c Membrane Waterproofing 3-ply	SF	0.35	0.10	0.33	0.10	0.18	....	....	....	....	0.21	0.17
9	**Painting**	SF	0.125	0.097	0.095	0.13	0.07	0.10	....	.12	....	0.105	0.08
	DISTRIBUTION OF CONSTRUCTION COST BY PERCENTAGES OF TYPES OF WORK:		%	%	%	%	%	%	%	%	%	Average %	
	a Structure		65.8	74.1	65.5	68.7	69.3	73.8	66.4	66.0	58.9	67.6	
	b Heating and ventilating		11.6	11.0	11.2	14.1	15.6	10.5	9.8	17.1	20.9	13.5	
	c Plumbing		8.2	6.6	6.3	7.7	3.2	10.6	13.0	5.5	7.1	7.6	
	d Electrical		13.1	7.6	5.6	8.9	9.4	5.1	10.8	11.4	13.1	9.5	
	e Elevators		1.3	0.7	0.9	0.6	2.5	....	....	....	....	....	
	f Kitchen Equipment		....	....	10.5	....	....	....	....	....	....	....	

NOTE: All these buildings are heated by High Temperature Hot Water from Central Boiler Plants. Total cost of the Central Heating Systems, including Plants and underground distribution, is approximately $3,000,000. If this cost were prorated to each building, percentage for heating and ventilating would be increased by about 3% of the total building cost.

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THE TALLEST
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EXECUTIVE HOUSE—combination hotel and apartment building at 63-73 E. Wacker Drive, Chicago
Architect: Milton M. Schwartz & Associates, Inc., Chicago
Structural Engineer: Miller Engineering Company, Chicago

Another record year for REINFORCED CONCRETE

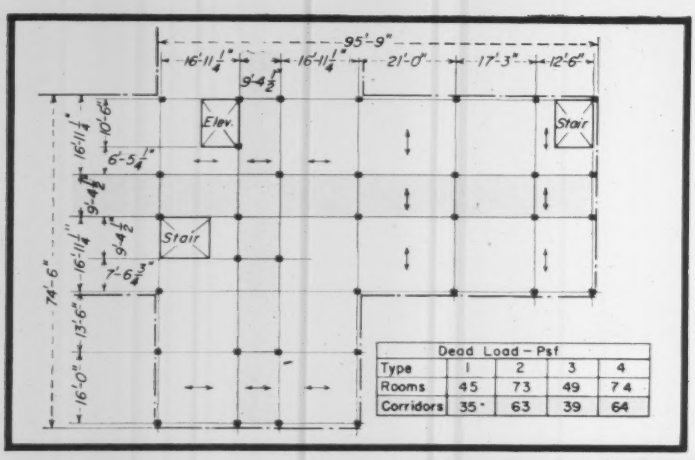
1958 Promises to be another record year for reinforced concrete construction. A significant example of this trend toward reinforced concrete is the new 40-story structure shooting up on Chicago's Wacker Drive. It will be the tallest reinforced concrete structure in the U.S.A. Before you build, investigate this economical, flexible, and time-saving medium of construction.

CONCRETE REINFORCING STEEL INSTITUTE
38 S. Dearborn St., Chicago 3, Illinois

Cost Study of

Gilbert Seymour Feldman
Structural Engineer
Charles Nagel & Associates
Milwaukee, Wisc.

In designing a two-story and basement Chronic Disease Unit Addition to the Beloit Hospital, Beloit, Wis., we made a cost comparison of four different types of structural framing for the floors. The results are presented here. They are intended to apply only to the general type of structure used as a basis for this study (see floor plan).



Dead Load – Psf				
Type	1	2	3	4
Rooms	45	73	49	74
Corridors	35	63	39	64

Framing Types Compared

TYPE 1. Structural steel

TYPE 2. Concrete slab band

TYPE 3. Concrete joists, metal-pan fillers

TYPE 4. Concrete joists, concrete-block fillers

1. Total cost for type 3 framing is the lowest for the three live loads considered. Type 1 is the most expensive if a fireproofing ceiling is required.

2. Cost-per-square-foot comparison places the four types of framing in the same relative position as did the total-cost study, since the floor areas are nearly equal. Doubling the live load increases the cost per square foot very little—about 8 to 12 cents.

3. Percentage cost of the framing types with low-cost type 3 taken as 100% is nearly constant for each of the three live loads considered.

4. Live-load effect on costs is not very great. For the concrete designs, cost increments are nearly constant for constant live-load increments in the range studied.

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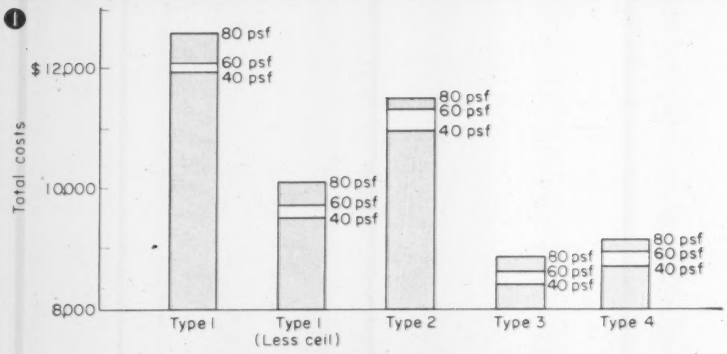

Total Cost of Four Types of Floor Framing

Live load	Type 1 5,139 sq ft	Type 1 (less ceil.)	Type 2 5,236 sq ft	Type 3 5,236 sq ft	Type 4 5,236 sq ft
40 psf	$11,945	$9,485	$10,989	$8,354	$8,646
60 psf	12,085	9,625	11,282	8,598	8,893
80 psf	12,545	10,085	11,452	8,796	9,115

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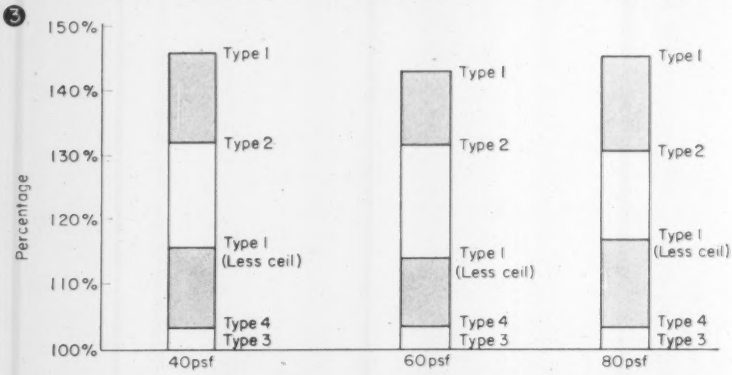


Percentage Variation in Cost by Types Based on Type 3

Live load	Type 1	Type 1 (less ceil.)	Type 2	Type 3	Type 4
40 psf	145.7%	115.8%	131.9%	100.0%	103.4%
60 psf	143.3%	114.1%	131.3%	100.0%	103.5%
80 psf	145.1%	116.9%	130.1%	100.0%	103.6%

Four Types of Hospital Floor Framing

The building actually was designed and built with a reinforced concrete frame, with concrete joists and concrete block fillers. Concrete joists were selected for economy, and block fillers were chosen for acoustical properties.

Ames and Bischoff were the architects and Charles Nagel & Associates, the structural engineers—both of Milwaukee, Wis.

For the purpose of this study, about half of one floor of the original unit, an area of about 5,200 sq ft, was designed with four different, standard methods of framing. Three live loads—40, 60 and 80 psf—were considered for each design. The original column spacings, bay sizes, spandrel-beam sizes and column sizes were retained.

The arrangement of columns, with a narrow bay flanked by one almost twice as wide on each side, the beams paralleling the corridors, is applicable not only to hospitals, but to schools, office buildings, apartment buildings and other similar types of structures.

The three live loads were applied to the "room" bays, whereas the "corridor" bays were designed for an 80 psf live load consistently. In addition, a dead load of 10 psf was allowed in all "room" bays for partition loading.

Four types of standard construction were used:

Type 1. Structural steel beams, open-web steel joists, corrugated steel concrete forms, 2-in. concrete fill reinforced with 30 psf mesh.

Type 2. Reinforced concrete slab-band construction; with one-way slabs spanning between the wide, shallow beams.

Type 3. Reinforced concrete joist construction; with metal-pan fillers and concrete beams.

Type 4. Reinforced concrete joist construction; with concrete block fillers and concrete beams.

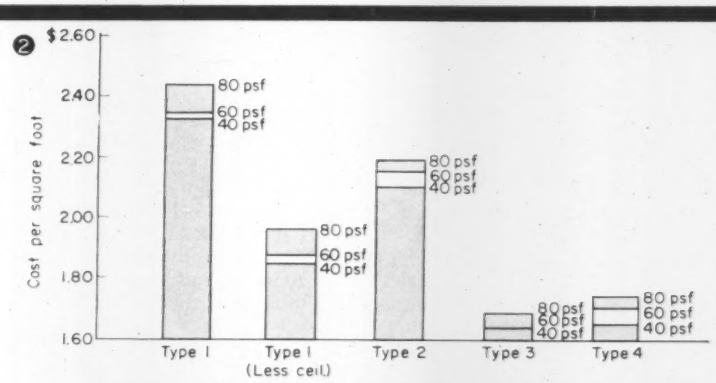
• **Particular applications**—For the types of building occupancies considered, most codes require live loads for rooms to be 40 or 50 psf; but various specific job requirements should be considered in utilizing the data presented here. Thus, the dead loads due to different types of partitions, special floor finishes, various ceilings, etc., should be added to the required live load for the specific case under consideration. Then, the total loads can be compared with the combinations of dead and live loads shown.

• **Items in this study**—The masonry load on the spandrel beams was assumed as 4 in. face brick and 8 in. lightweight concrete block backup, with a floor-to-floor height of 11 ft. For the structural steel design, the columns were assumed to be 8WF31; for the concrete designs, the column size was assumed as 12x12 in. The spandrel beams were fixed at 8x29 in., as in the original building. The cost of footings, columns, stair construction and brick angles was considered constant in all cases and hence omitted for comparison purposes.

Since hospitals, apartments, schools, offices, etc., are almost invariably required to be of fireproof construction, the structural steel design includes a 10 psf dead-load allowance for a suspended plaster ceiling. Tabulations are presented with and without ceiling costs. Structural steel shapes selected were of the lightest practicable size. For cost comparison, the beam sizes were varied with the span.

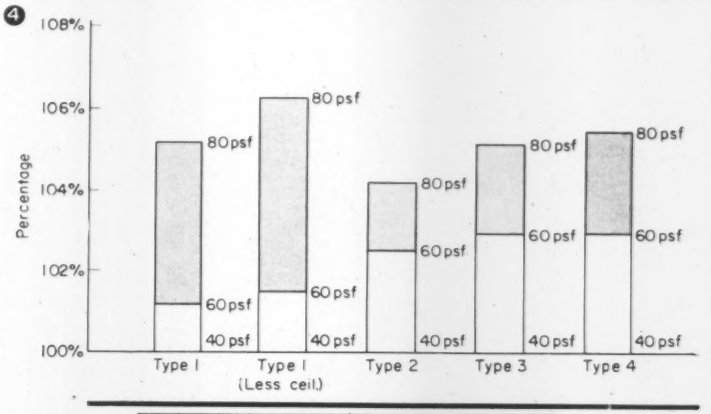
For concrete designs, no checkerboard loading patterns were used. All concrete beams in a series of spans were made the same size to reduce forming costs.

Beams for the slab-band designs were held to a 12 in. depth but were made



Cost per Square Foot of the Four Types

Live load	Type 1	Type 1 (less ceil.)	Type 2	Type 3	Type 4
40 psf	$ 2.33	$ 1.85	$ 2.10	$ 1.60	$ 1.65
60 psf	2.35	1.87	2.16	1.64	1.70
80 psf	2.44	1.96	2.19	1.68	1.74



Percentage Increase in Cost with Live Load

Live load	Type 1	Type 1 (less ceil)	Type 2	Type 3	Type 4
40 psf	100.0%	100.0%	100.0%	100.0%	100.0%
60 psf	101.2%	101.5%	102.5%	102.9%	102.9%
80 psf	105.2%	106.3%	104.2%	105.2%	105.5%

. . . Framing costs

quite wide, since wide beams in this type of framing greatly reduces the bending moment in adjacent slabs.

For both types of concrete joist construction, maximum depth of beams was held to 18 in.

No ceiling dead load was assumed in the concrete designs inasmuch as most acoustical ceilings now in common use are relatively light.

No allowance was made for the thickness of the filler shell in the design of concrete joists with block fillers.

Design stresses used were 1,250 psi for concrete and 20,000 psi for structural and reinforcing steel. Codes followed were the Wisconsin State Building Code and American Concrete Institute building code, 1951.

Stirrups were used in all concrete beams to carry top bars, even when they were not needed for shear. No bending of bars was specified, except for standard hooks at beam or slab ends.

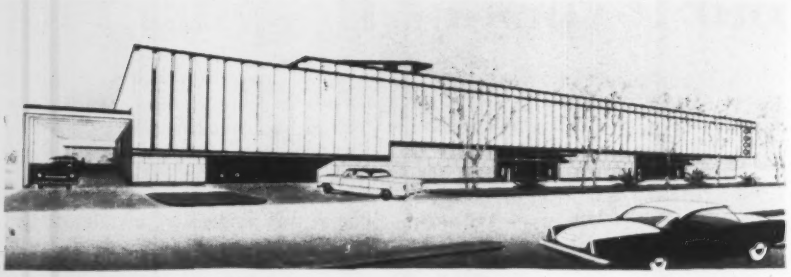
Construction costs presented were actual Milwaukee area costs (1957) obtained from local contractors. These costs were based on a building area about six times as large as the area used for the design, to correspond more closely with actual bidding prices for a building of the nature contemplated. The unit prices used in deriving costs include 25% fo roverhead, insurance and profit..

• **Cost analysis**—As can readily be seen from the tabulations of total costs, the consistently cheapest system of framing was type 3, metal-pan concrete joists. Next, was type 4, concrete joists with concrete-block fillers.

The third cheapest type of construction hinges on the need for fireproof construction. If fireproofing is not required, type 1, structural steel construction, not including the cost of a plaster ceiling, assumes third place in relative cost. The most expensive was type 2, slab-band construction. If, however, a plaster ceiling is required to fireproof the structural steel, the added cost causes type 1 to be the most expensive and type 2 moves into third place.

[For this type of building, with short spans, the analysis indicates that the cost of fireproofed steel framing may be considerably greater than the framing the study indicated to be cheapest; however, because items of constant cost have been omitted from this study, the actual cost ratios are much smaller than shown in the charts.

The variation in steel-framing costs with live load appears to be larger than that for the other types; but this condition could well be reversed if span or framing were changed to permit more effective utilization of the standard sections.—Editor]



SELF-PARKING GARAGE has four elevators to handle its 990 car capacity. Ground level exterior is plate glass in aluminum frames and stone facing. Upper walls on all four sides are of aluminum-faced curtain wall construction.

Garage Costs $4.41 per Sq Ft

Low bid of $1,926,000 is 3.7% under engineer's estimate and $522,750 under high bid for structure

Providing six parking levels and one shopping level, a new split-level, self-parking garage in Houston, Tex., is capable of handling 990 cars and has four elevators. The cost is $4.41 per sq ft for the structure and $4,431 per elevator per floor for the elevators.

The structure, the Professional Building Parking Garage, is being erected between Main St. and Fannin, on a plot 300 x 245 ft. Hedrick, Stanley and Lightfoot, Houston, are the architects and engineers on the project.

Out of 16 bidders, Sebastian Construction Co. of Houston was low for the building at $1,926,000, 3.7% under the engineers' estimate. Included in the low bid was: Electrical work at $145,000, plumbing at $84,000, heating, ventilating and air-conditioning at $20,000.

Westinghouse Electric Corp. was the low of four bidders on the elevators at $124,067.

Bidding ranged up to $2,448,750 for the building, $127,354 for the elevators. On completion time, the bidding ranged from a low of 330 to a high of 600 days. The contract time is 365 calendar days.

The building is fireproof and the below grade levels contain an exhaust system.

Lighting is with shielded fluorescent type, pendant-mounted fixtures.

Elevators will be automatic, with 2,000 lb capacity, 300 fpm speed, and set to stop at seven levels.

The exterior at ground level will be ¼ in. polished plate glass in aluminum frames and stone facing to match the existing, adjoining Hermann Professional Building. Upper walls on all four sides and above roof levels are faced with aluminum panels.

Substructure and frame are reinforced concrete grade beams, piers, footings and columns. Membrane waterproofing is on walls below grade, and on the slab below sub-basement floors.

Floors are cast-in-place metal-pan construction supported on concrete columns. Use of belled footings, up to 190 in. in diameter, the largest ever drilled in the Houston area, are estimated to have resulted in a considerable saving over spread footings.

Space was divided like this:

Level No.	No. of Cars	Parking Area sq ft	Sq ft per Car
−2	128	47,949	375
−1½	41	16,635	406
−1	124	47,949	387
−½	29	16,635	574
1 (Rental space)	none	44,191	
1½	39	21,751	558
2	125	47,949	384
2½	43	16,635	387
3	125	47,949	384
3½	43	16,635	387
4	125	47,949	384
4½ (Roof)	43	16,635	387
5 (Roof)	125	47,949	384
Total-parking	990	392,620	397
Total space	...	436,781	

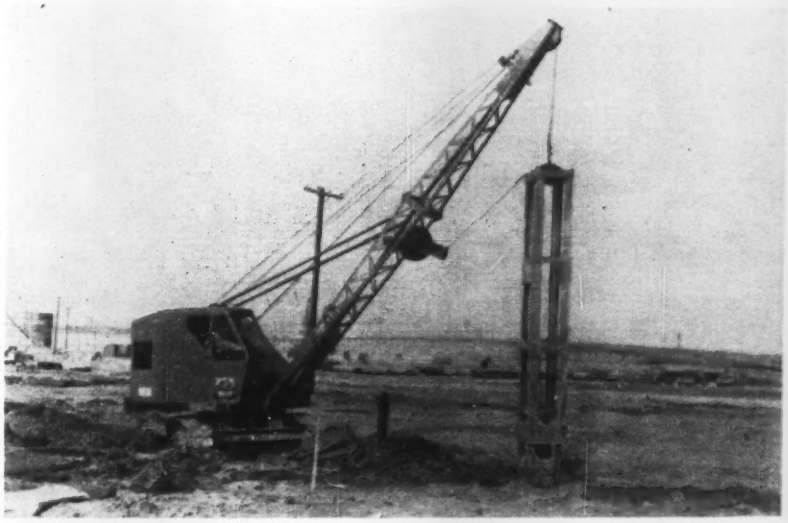
A summary of bid prices shows:

Structure	Low	Aver	High
Sq ft/car/floor	375	396	574
Cost per sq ft	$4.41	$4.885	$5.61
per stall	$1,746	$1,934	$3,220
Completion time, cal days	330	.....	600
Elevator	**Low**	**Average**	**High**
Cost per elevator per floor	$4,431	$4,478	$4,548
per stall	$125	$127	$129
Stalls per elevator	.....	292.5	.....

Cost Index Slide Rule

A six-inch circular slide rule, with built-in projection for reading Prof. W. L. Nelson's Petroleum Refinery Construction Cost Index from 1947 to April 1957, has been developed by the cost engineers of Chemical Construction Corp., New York. It is called "Chemico Cost Projector" and is printed on plastic. Its price, $2.00.

Besides the cost index readings with the aid of a moving pointer arm it carries a capacity ratio scale and standard slide rule scales on its perimeter. Examples show how to use it.



Tamper Attachment for Small Power Crane

A specially designed tamper attachment for its complete line of power cranes and excavators has been announced by Schield Bantam Co.

The addition of the tamper attachment brings to 10 the number of units made for crawler-mounted, or self-propelled model Bantams.

An outstanding feature of the new tamper, according to the manufacturer, is the fact that it offers 80% to 100% compaction at a maximum penetration of three feet. With this tamper method, it is claimed that only three full-load passes at a given point in average ground will bring full compaction. Schield Bantam Co., Waverly, Iowa.

Small Dredge Designed for Special Jobs

Digging in close quarters, as here in the Xochimilco canals near Mexico City (see also ENR Jan. 9, p. 67), is one of the things that a new small dredge can do readily.

In addition, it can operate in very shallow water, is a completely self-contained and self-propelled unit and has a high output for its 8 in. discharge size.

Designated as a "swinging ladder" type, and known as the "Dragon" model, the new dredge is built so that the cutter head and its supporting ladder move independently of the hull, eliminating the need for wide swinging room. It can thus work in a channel

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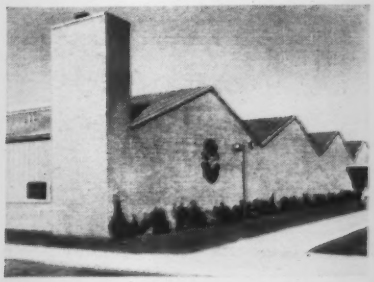

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BIG JOB
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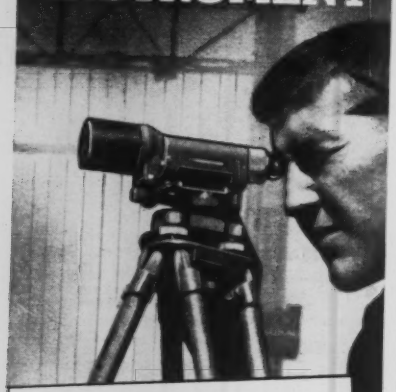

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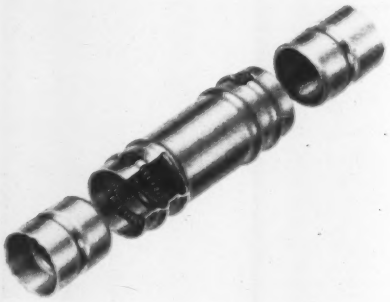
only 13 ft wide compared with the 30 ft said to be needed for conventional 8 in. dredges.

Another feature of the dredge is a power-operated suspended discharge pipe that can be trained to discharge over either bank of a canal or can be attached to a pontoon-supported pipeline. Excavation with the new machine can be carried down to 8 ft below the water surface.

Depending on the type of the material encountered the dredge's digging capacity is said to vary between 50 and 100 cu yd per hour. ELLICOTT MACHINE CORP., BALTIMORE, MD.

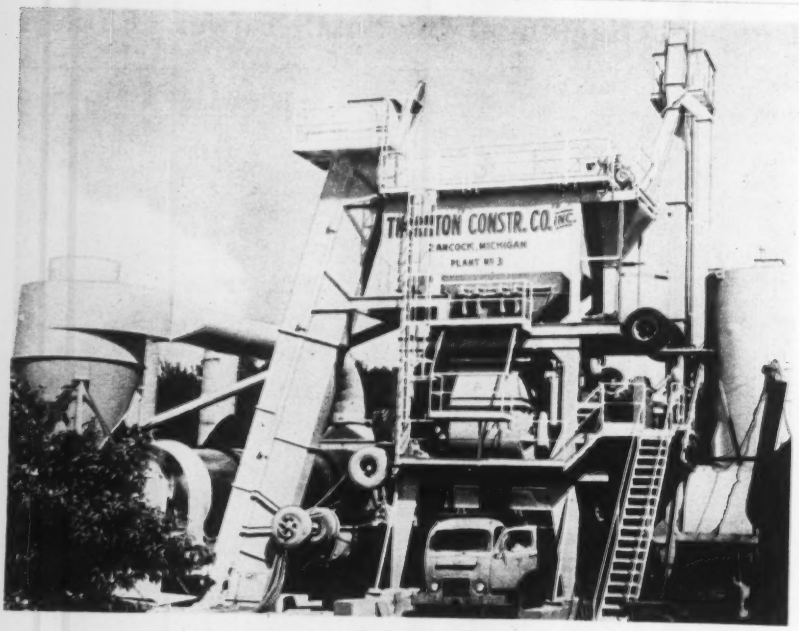
Spring-Coupled Pipe Requires No Threads

A new industrial pressure pipe called Ames Positive-Lock requires no threaded connections or sealing compounds. According to the manufacturer, the product provides an airtight and watertight seal while transmitting at pressures up to 1,500 psi either liquids or semi-solids.



Connections are through a coupler, a short section of aluminum or steel pipe containing the locking device and a neoprene ring. A length of pipe is inserted into each end of the coupler

(*Continued on page 112*)



New Plant Mixes For Mackinac Bridge

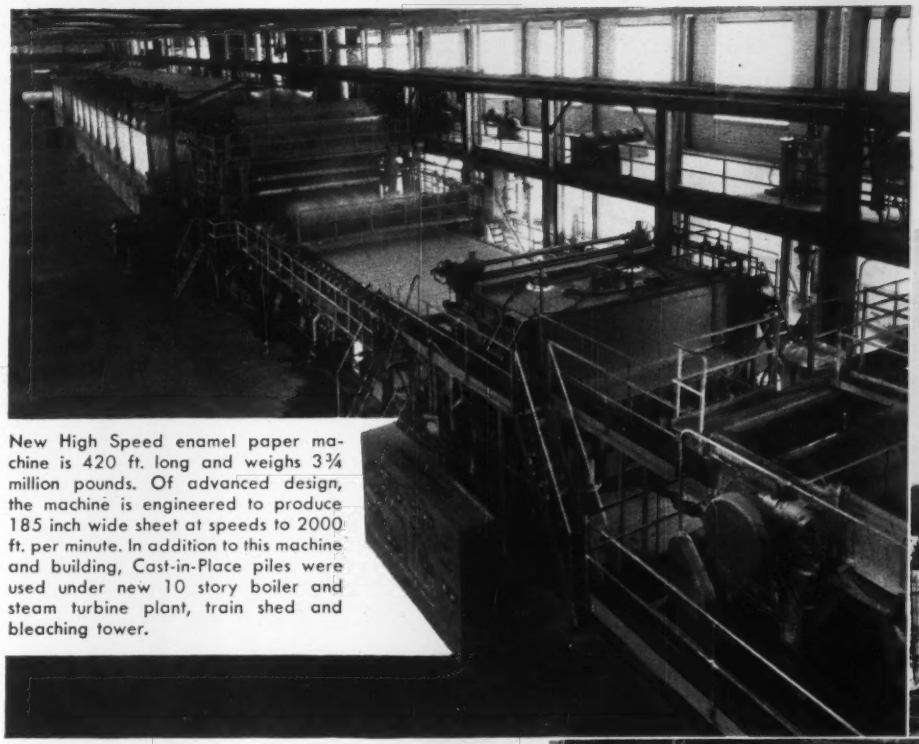
Bigness, complete portability and fast automatic operation are the features claimed by the manufacturers for the new Madsen Model 481 asphalt plant that was used in surfacing Michigan's new Mackinac Bridge.

Capable of turning out more than 200 tons per hour, the plant also is completely portable. Transport wheels are furnished for the screen bin section, mixer weigh-box section, hot stone elevator and dryer.

Fully automatic operation is featured with re-cycling of up to 400 batches. A choice of three mixes can be had.

The plant follows the trend to larger bins with a 4 compartment, 50 ton capacity bin. The weigh box has a gross level full capacity of 120 cu ft and a working capacity of 100 cu ft.

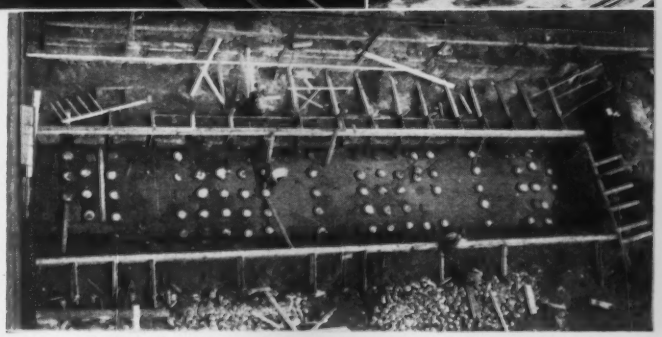
A 96 in. dia by 40 ft long dryer is furnished with the plant. It also is equipped with a 12 ft dia cyclone dust collector to meet air pollution requirements. MADSEN WORKS, 14120 E. ROSECRANS BLVD., LA MIRADA, CALIF.



New High Speed enamel paper machine is 420 ft. long and weighs 3¾ million pounds. Of advanced design, the machine is engineered to produce 185 inch wide sheet at speeds to 2000 ft. per minute. In addition to this machine and building, Cast-in-Place piles were used under new 10 story boiler and steam turbine plant, train shed and bleaching tower.

Cast-in-Place rig places pile close to existing building without danger of vibration damage.

paper production boosted on Cast-in-Place piles



Cast-in-Place pile pattern for section of new plant.
(Photos—courtesy Consolidated Water Power & Paper Co.)

In planning new buildings for a 15 million dollar expansion program, Consolidated Water Power & Paper Company was confronted with difficult soil conditions at their Biron, Wisconsin, plant.

Borings indicated the existence of a non-uniform sand, clay, and decomposed granite soil underlain by granite bedrock at irregular depths. A further complication was the periodic rise and fall of the nearby river, causing a fluctuating water table and consequent movement or loss of fines in some areas. Under these conditions, it was considered inadvisable to depend on spread footings for buildings or high-load machine foundations. It was recommended that all loads be transferred directly to bedrock through the use of economical Cast-in-Place INTRUSION mortar piles.

INTRUSION-PREPAKT Cast-in-Place piles offered advantages not obtainable with any other type. Highly mobile equipment permitted operations close to existing buildings without danger of vibration or ground heaving usually associated with driven piling. In areas where soil was not self-supporting, casing was unnecessary because INTRUSION mortar under pressure fills hole as auger is withdrawn. This pressure also provided some lateral penetration to stabilize weak soil zones and increase pile skin friction. In all, some 1300 high-strength Cast-in-Place piles were placed for Consolidated's expansion program that added 230,000 square feet of floor space.

Cast-in-Place piles have a proven record of success all over the world. In addition to foundations, they provide a practical solution to many shoring, underpinning, stabilization and cofferdam problems. For more information on Cast-in-Place piles and other I-P construction services, contact: INTRUSION-PREPAKT, INC., 568-M Union Commerce Bldg., Cleveland 14, Ohio. In Canada, INTRUSION-PREPAKT, LTD., 159 Bay Street, Toronto, Ontario.

INTRUSION-PREPAKT, INC.

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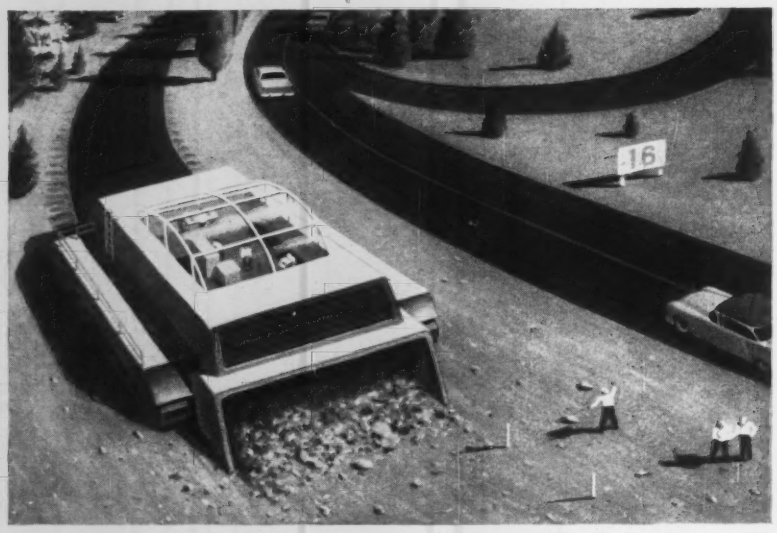
•Intrusion and Prepakt are trade marks of Intrusion-Prepakt, Inc. whose methods and materials are covered by U. S. Patents Nos. 2313110, 2655004, 2434302 and others, also patents pending.

MARS outstanding design **SERIES**

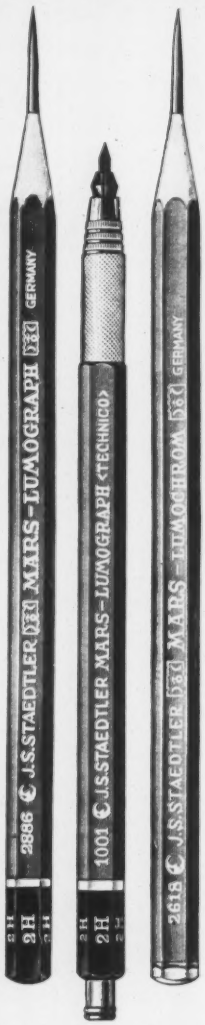


roll your own!

Speeding up our national road-building program is the goal of this design by Russ Henke of Elm Grove, Wisconsin. His behemoth of a machine literally chews up unmapped earth, compacts it with asphalt or macadam, stabilizes it, and lays a ribbon of paved road behind as it rumbles along! Crew and engineers ride in an air-conditioned cabin, and monitor the whole process by control instrumentation.

Tomorrow's *roads* may be squeezed out like toothpaste, but outstanding *ideas* for tomorrow are still produced in the old-fashioned, painstaking, human way. And only professionals know how the best in drafting tools can smooth the way from dream to practical project.

In pencils, of course, that means Mars, long the standard of professionals. Some outstanding new products have recently been added to the famous line of Mars-Technico push-button holders and leads, Lumograph pencils, and Tradition-Aquarell painting pencils. These include the Mars Pocket-Technico for field use; the efficient Mars lead sharpener and "Draftsman" pencil sharpener with the adjustable point-length feature; Mars Lumochrom, the color-drafting pencils and leads that make color-coding possible; the new Mars Non-Print pencils and leads that "drop out" your notes and sketches when drawings are reproduced.


2886 J.S.STAEDTLER MARS-LUMOGRAPH GERMANY
1001 J.S.STAEDTLER MARS-LUMOGRAPH "TECHNICO"
2618 J.S.STAEDTLER MARS-LUMOCHROM GERMANY

The 2886 Mars-Lumograph drawing pencil, 19 degrees, EXEXB to 9H. The 1001 Mars-Technico push-button lead holder. 1904 Mars-Lumograph imported leads, 18 degrees, EXB to 9H. Mars-Lumochrom color-drafting pencil, 24 colors.

J.S. STAEDTLER, INC.
HACKENSACK, NEW JERSEY

at all good engineering and drawing material suppliers

and locked in one operation by inserting a stainless steel coil spring into an opening at the top of the coupler. This spring rides in twin-half round grooves, one in the coupler and one in the pipe, completely encircling the pipe and making accidental uncoupling unlikely. A second groove in the coupler section holds the neoprene ring, which presses tightly against both pipe and coupler to make a positive seal.

The pipe can be used for water, compressed air, spray painting or sluicing. It is available in 2, 3 and 4 in. dia sizes and in lengths of 20, 30 and 40 ft. Valves, tees, elbow reducers and other fittings are available. W. R. Ames Co., 1001 Dempsey Road, Milpitas, Calif.

Hauling Trailer Is Light But Has a Big Capacity

A new 35-ft-long platform trailer, which weighs 7,950 lb, is said to be capable of carrying any legal load under all normal operating conditions.

A newcomer to the Brown trailer line, which previously has included only van-type trailers, the platform unit is said by the company to be an important step in its expansion and diversification program.

Built to replace trailers weighing up to 5,000 lb more, the new trailer gets its strength with light weight from selection of aluminum and special high strength steel alloys, the manufacturer says. The floor has an extruded aluminum center strip, with 5/4 tongue and groove fir flooring at the sides and front. Rope tie hooks on the longeron help to tie down the load, or to batten down a tarpaulin to protect the load. Cast aluminum stake pockets along the length of the unit are standard on the platform trailer and are provided unless otherwise stipulated. Brown Trailer, Inc., Box 54, Spokane, Wash.

Operator Walks or Rides On Concrete Power Buggy

A concrete power buggy that allows the operator to either walk or ride on a fold-down platform now is available. The manufacturers says the buggy is compact, lightweight and extremely maneuverable—with a low center of gravity giving it fast cornering ability.

The new unit has a capacity of 10 cu ft of concrete that is placed with a positive-control dumping mechanism. It has front-wheel chain drive, automatic clutch with forward and reverse drive. Speed is up to 5 mph. Whiteman Manufacturing Co., 13020 Pierce St., Pacoima, Calif.

Firestones beat downtime delays!

From the Los Angeles Freeways to the Connecticut Turnpike, Firestones lead the way in beating breakdown losses. Firestone Rock Grip Tires, with S/F (safety-fortified) Nylon, roll longer with less downtime than any other tire! Two great tread designs match these off-the-highway tires to *any* job and eliminate tire changes. You get the *flotation and traction* you need in loose earth and wet going. You get S/F Nylon's armored protection for hauls over splintered shale and knife-edged rubble. Firestone tires defy cuts and slugging impacts like no other tires made. Ask your Firestone Sales Engineer about these *tubed* or *tubeless* heavy-duty tires. Call him today at your local Firestone Dealer or Store.

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Firestone

BETTER RUBBER FROM START TO FINISH

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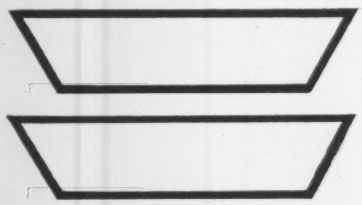
TRICKY TRACINGS

Question: At a glance, can you tell which of the two pans is larger? See answer below.



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Whichever way you figure it, Arkwright Tracing Cloths offer more for your drafting dollars. Made to meet Government specifications, Arkwright's superior surface is completely free of pinholes, coarse threads and other imperfections which cause feathering or blobbing. Its permanent transparency eliminates discoloring and brittleness . . . protects your drawings against the wear and tear of time and constant handling.

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Publications

Lift trucks—Information on construction, operation and maintenance, plus data on handling and stacking techniques, are contained in a new "Lift Truck Operators' Guide." TOWMOTOR CORP., CLEVELAND, OHIO.

Loaders-tractors—The three-color folder that describes in detail recently introduced lines of loaders, tractor shovels and backhoes is now ready for distribution. The primary emphasis is on new equipment, but all other equipment manufactured by the company is portrayed. HENRY MANUFACTURING CO., P. O. BOX 521, TOPEKA, KAN.

Demolition tools—A 24 page illustrated bulletin titled "Accessories for Demolition and Digging Tools" features a complete line of digging tools and accessories. One section deals with safety tools for places where sparks can't be tolerated. The bulletin, which describes 16 variations of digging and demolition tools and 64 accessories, includes a page on reforging, sharpening and proper method of hardening the tools. INGERSOLL-RAND CO., 11 BROADWAY, NEW YORK 4, N. Y.

Bucket drilling—"Methods Manual" is the title of a 16 page booklet that illustrates and describes bucket drilling as a method of excavating for tank burial, foundations, manholes, cesspools, soil tests and other digging jobs. CALWELD, INC., 7222 E. SLAUSON AVE., LOS ANGELES 22, CALIF.

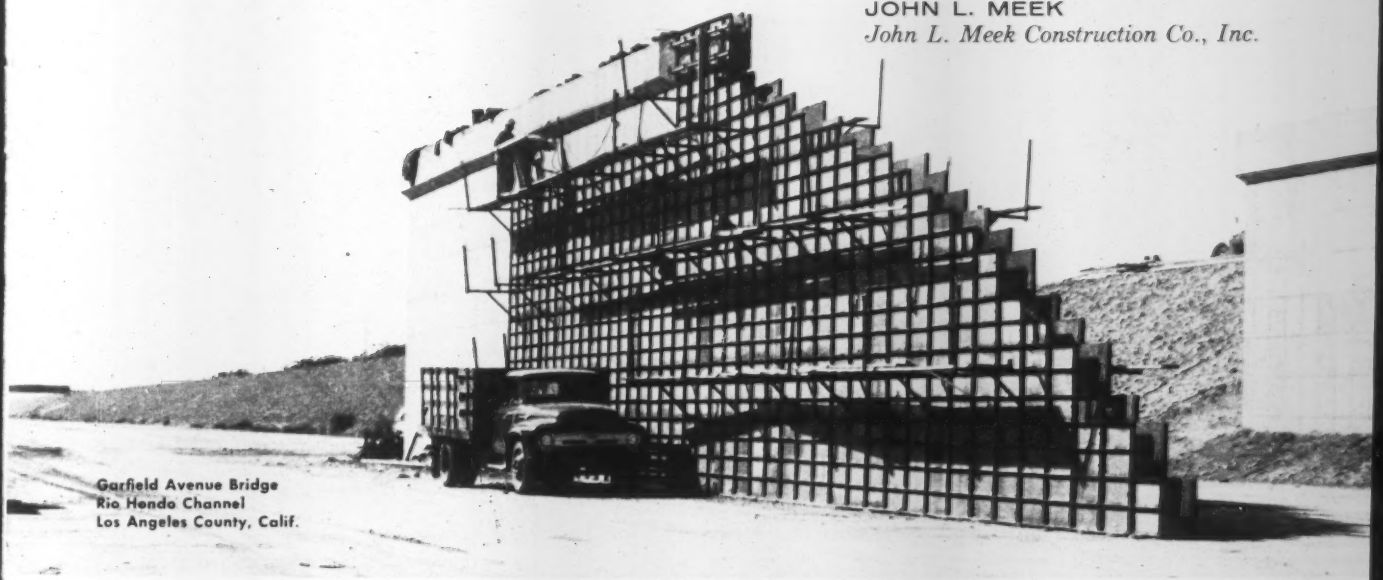
Fork lift truck—Engineering principles involved in production of a fork lift truck and analysis of the individual components that go into the finished product are included in an illustrated brochure on materials handling equipment. Title is "What Makes Towmotor Tick." TOWMOTOR CORP., 1226 E. 152ND ST., CLEVELAND 10, OHIO.

Excavator—Photos of job applications and parts of the 805 Excavator are included in a four-page bulletin. KOEHRING DIV., 3026 W. CONCORDIA AVE., MILWAUKEE 16, WIS.

Industrial Pumps—Triplex pumps for use in industrial plants where high pressure (up to 20,000 psi) and high temperatures (in excess of 500 F) are required are described in a 12 page bulletin. Applications include operation of hydraulic test equipment, molding presses, lubricating systems and others. KOBE, INC., 3040 E. SLAUSON AVE., HUNTINGTON PARK, CALIF.

"my men were UNI-FORM **EXPERTS** *an hour after they began using them"*

JOHN L. MEEK
John L. Meek Construction Co., Inc.



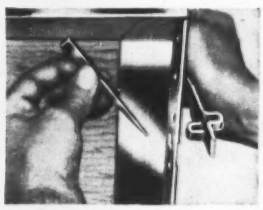
Garfield Avenue Bridge
Rio Hondo Channel
Los Angeles County, Calif.

Stripping center of 3 piers. Piers were 26' high, with 40" cap. UNI-FORM Scaffold Brackets attach to steel frame of UNI-FORMS.

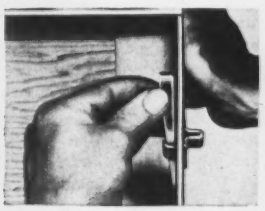
When inexperienced crews—men who have never used them before—can become expert in the handling and erection of UNI-FORM Panels in an hour or two, it means big savings in time and labor . . . faster job progress and lower all around costs. Simple mechanical assembly of UNI-FORM Panels permits fewer men to form more contact area per hour than is possible with any other job-erected forming system. The John L. Meek Construction Company's experience with UNI-FORM Panels is typical—quick mastery of the simple UNI-FORMING technique, resulting in faster forming with less labor. A good reason why more concrete is being formed every day with UNI-FORM Panels . . . why more contractors are using the UNI-FORM System for all their forming, regardless of type and size of the job. Write for the UNI-FORM Catalog—illustrates and describes the complete UNI-FORM System.

Pier and wing wall is 122' long. Tapered wing walls cut flow pressure.

UNI-FORM ASSEMBLY IS SIMPLE AS THIS:



1. UNI-FORM Tie Loop is placed into the square tie hole of Panel.



2. Tie Key is set into the Tie loop. This locks tie and Panel into 1 unit.

3. Bring next UNI-FORM Panel into position. Insert Tie Key in other Tie loop. Assembly is completed.

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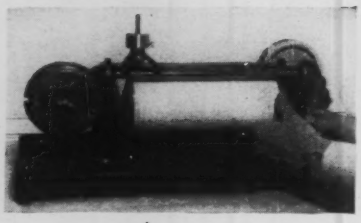

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Continuous record on graph chart for 24 hours or 8 days. Positive response to fluctuation by float, perforated tape and sprocket wheel. Finest quality "Chelsea" marine clock. Metal base and cover. Made of non-corrosive materials throughout. Ranges 1 to 40 ft., or 30 cm. to 12 meters.

Use Gurley Graphic Water Level Recorders when you need dependable records of reservoirs, hydro plants, sewers and sewage systems, irrigation and stream gaging. *Write for Bulletin No. 50 and details on Gurley Water Level Recorders.*

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Legal

Suit for Extra Work

Sub awarded judgment for reasonable value

Where a subcontractor, with the knowledge and consent of the general contractor, has had to correct deficiencies of previous subs, and completion of the subcontract has been prevented arbitrarily by the general contractor, the subcontractor has been allowed to recover for the extra work on the basis of its fair and reasonable value.

The action was brought against a general contractor under the Miller Act to recover for materials and labor supplied by plastering subcontractors on a government project.

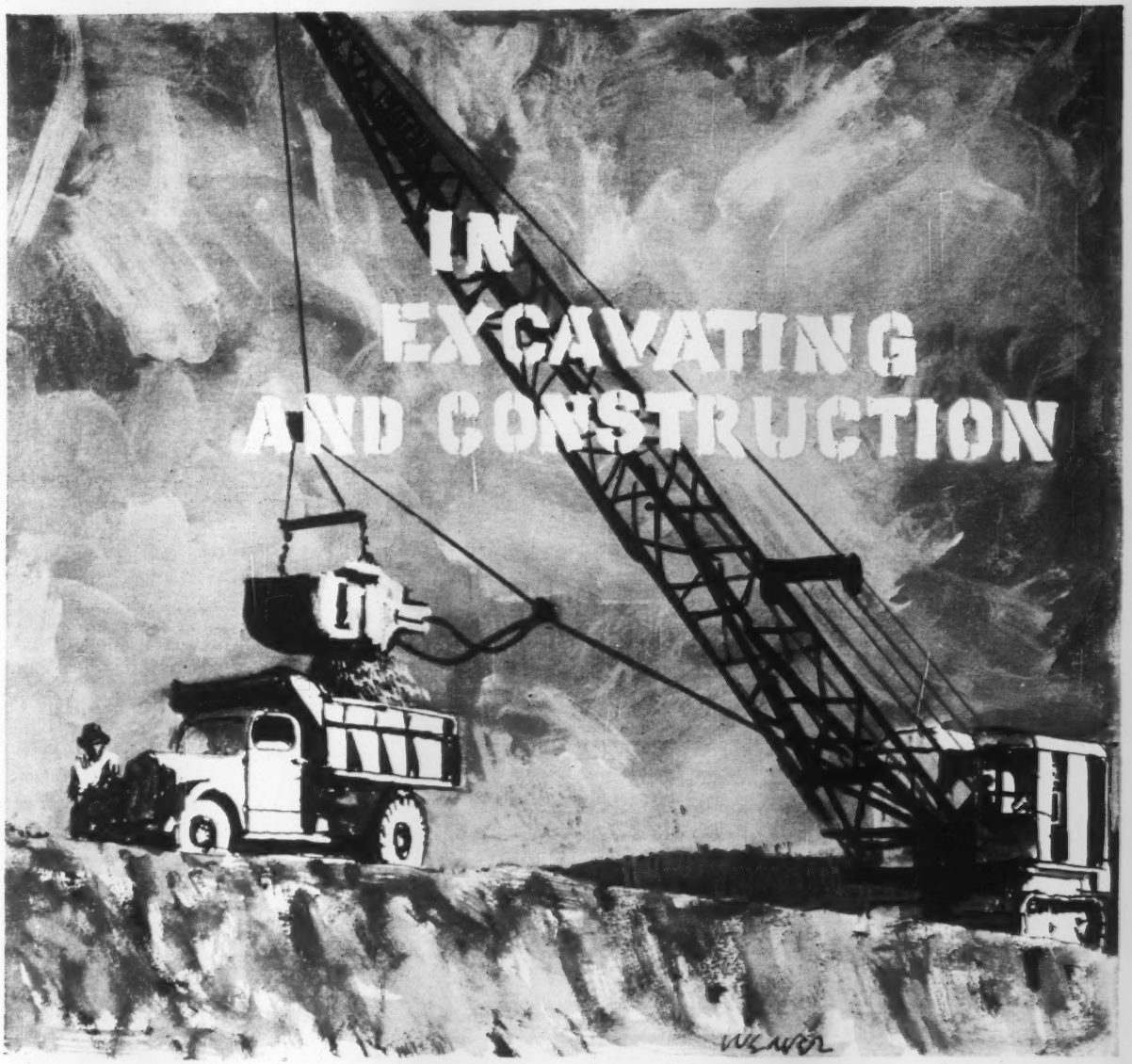
The trial court awarded the subcontractors a judgment upon a finding that the prime contractor had wrongfully prevented the subs from performing their contract and had failed to compensate the subs for extra work and materials furnished. The judgment was affirmed on appeal.[1]

The subcontract provided that all work to be done under it was to be performed to the satisfaction of the prime contractor and the government, and the prime contractor contended that it was justified in terminating the subcontract because the work was not being done to its satisfaction.

The appellate court held that the evidence justified a finding by the trial court that the claim that the work was not being satisfactorily performed was not made in good faith.

"The subcontract," according to the appellate court, "provided that the appellees (subcontractors) were not required to perform any extra work on the job until they received a confirming order for such work from the general contractor. While the appellants did give the appellees general authorization to perform all extra work necessary to correct the deficiencies of prior subcontractors, the district court found that the appellants (prime contractors) arbitrarily refused to agree to pay appellees reasonable compensation for it. Under these circumstances the district court's conclusion that the arbitration clause in the subcontract did not come into operation was not erroneous.

"The appellants contend that the district court was in error in awarding judgment for the value of the extra work done by the appellees in the absence of proof that they could have completed the regular work called for by the subcontract at a profit. The ap-



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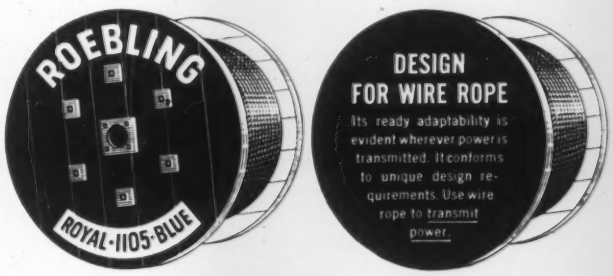
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pellants rely for this position upon the rule in Ohio that recovery in quantum meruit (basis of fair and reasonable value) will not be granted when the plaintiff would have lost more by fully performing at the contract price than by not performing. Cleveland Co. v. Standard Amusement Co., 1921, 103 Ohio St. 382, 133 N. E. 615; Wellston Coal Co. v. Franklin Paper Co., 1897, 57 Ohio St. 182, 48 N. E. 888. See Allen, Heaton & McDonald, Inc., v. Castle Farm Amusement Co., 1949, 151 Ohio St. 522, 86 N. E. 2d 782. That rule, however, has no application where, as here, recovery is sought for work done over and above that called for by the contract."

(1) D. H. Dave, Inc. v Delia Plastering Co., 243 F. 2d 732, U. S. Court of Appeals, Sixth Circuit, April 30, 1957.

Agreement to Arbitrate Not Avoided by Lawsuit

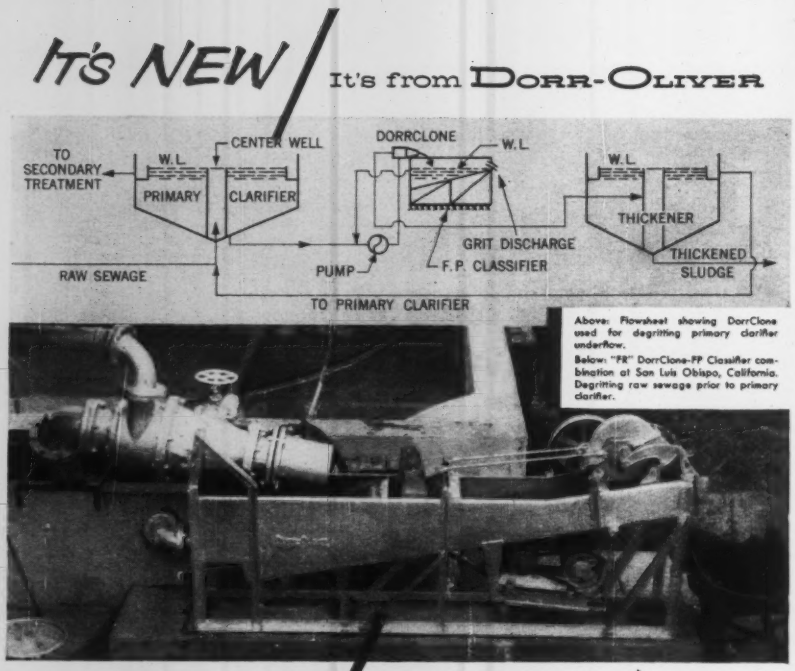
A general contractor sued by a homeowner for defects in a subcontractor's work cannot avoid arbitration of his dispute with the sub merely by citing the sub as a third party defendant.

In reaching this conclusion, a New York court had before it a suit for defective performance against the general contractor who built the house. Claimed defects related to the work of a subcontractor.

The general contractor served a third-party complaint against the sub asking for judgment against the sub if the homeowner was awarded damages against the general contractor.

The contract between the general contractor and the subcontractor contained the following provision: "All questions that may arise under this contract and in the performance of the work thereunder, shall be submitted to arbitration at the choice of the parties hereto." After the general contractor had served the third-party complaint against the subcontractor, the latter applied to the court for an order staying the action and demanding that the dispute be settled by arbitration as provided for in the contract. The court granted the application of the subcontractor.[1]

The court held that the general contractor could not circumvent the provisions of the subcontract as to arbitration of disputes by making the subcontractor a third-party in the action brought by the owner against the general contractor. "It is no answer," the court said, "that the litigation between the owner and the contractor may be resolved at law, and that therefore the controversy between the contractor and the subcontractor should also be deter-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RAW SEWAGE
PUMP
TO PRIMARY CLARIFIER
Above: Flowsheet showing DorrClone used for degritting primary clarifier underflow.
Below: "FR" DorrClone-FP Classifier combination at San Luis Obispo, California. Degritting raw sewage prior to primary clarifier.
THE DORRCLONE CLASSIFIER
for degritting sewage
Proven for many years in a wide range of industrial and chemical processing applications, the DorrClone Classifier has now been adapted to the sewage treatment field for removing grit from raw sewage and settled sludge.
Essentially, the DorrClone is a compact cylindro-conical classification unit utilizing centrifugal force in place of gravity. In operation feed enters near the base of the cone tangentially, causing a vortex movement. Centrifugal forces throw the grit to the walls of the cone, where they collect, pass toward the apex, and discharge out of the unit through the apex opening or valve. The lighter grit-free sewage and sludge move to the inner spiral of the vortex where they are displaced into the vortex finder or overflow opening.
Full scale installations have proven that this unit is applicable to the degritting of raw sewage prior to primary sedimentation; the degritting of primary clarifier underflow prior to Denaludge Thickening; and the washing of Detritor Collecting Tank discharge.
For more information on the new sewage applications of the DorrClone, write for a copy of Bulletin No. 2508 — just off the press — Dorr-Oliver Incorporated, Stamford, Connecticut.
DorrClone, Denaludge, Detritor T.M. Reg. U. S. Pat. Off.
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Certified Transit Mix two-stop set-up includes 625 barrel main and auxiliary cement bins with dual automatic weigh batchers. The aggregate bin is equipped with triple automatic weigh batchers for simultaneously weighing of sand and two sizes of gravel.

Blaw-Knox Batch Plant helps set Illinois Toll Road Paving Record

Electronically controlled, fully automatic batch plant is the most advanced in road construction history

Fifteen-second batching to rigid specifications and close weight tolerance is the performance record of the Blaw-Knox Batch Plant that made possible the paving of 3100 feet of 25-ft. wide, 10" thick concrete in a single day on the Illinois Toll Road.

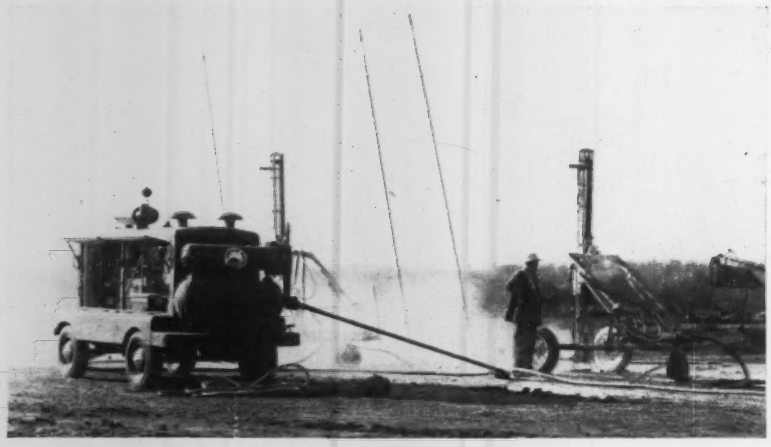
Production line handling of cement and aggregates coupled with features like simultaneous proportioning of sand and two sizes of gravel at the touch of a button, helped the Certified Transit Mix Corporation of New York maintain a daily production average of 1,600, 1.38-cubic-yard batches. Truck loading was geared into a continuous operation which kept thirty-two batch trucks on the seven mile run to the paving site. Warren Morreale, superintendent for Certified Transit Mix; credits the "smooth operation" of electronically controlled, fully automatic Blaw-Knox Batch Plant in maintaining the record output.

If you are looking for high production to tight specifications, let Blaw-Knox engineering experience and production know-how go to work for you. Your Blaw-Knox distributor can help "tailor" a rugged, automatic, high performance batch plant to your exact needs. And if you'd like the full story of the record-setting Blaw-Knox Batching and Paving Equipment on the Illinois Toll Road, write the Construction Equipment Division for a free copy of Reprint C.

BLAW-KNOX

BLAW-KNOX COMPANY

Construction Equipment Division
41 Charleston Avenue, Mattoon, Illinois



Only Jaeger delivers 600 cfm at 1650 rpm

Although powered with the same GM 6-71 diesel engine as the Jaeger "600", other compressors run 150 rpm faster to produce the same 600 cfm of air. In 8 hours' continuous operation a Jaeger averages 72,000 fewer revolutions, saves miles of engine piston travel and many pounds of fuel. Jaeger "125", "250" and "365" sizes are comparably efficient. See your Jaeger distributor for complete cost-saving data, or request Catalog JC-7.

THE JAEGER MACHINE CO., 200 Dublin Ave., Columbus 16, Ohio

Power Plants Speed Construction

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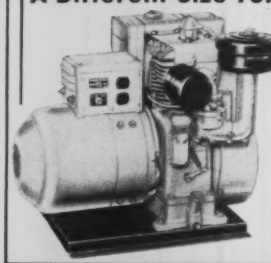

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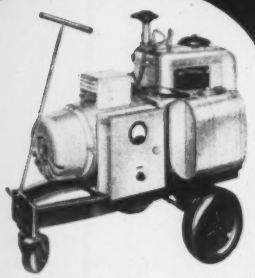

These rugged, heavy-duty 3-wheel dollies are used as a permanent mounting for 3, 4, and 5 KW electric plants where portability is desired by contractors, bridge builders, mine operators, road constructors, railroads, cities and municipalities.

Trailer-Mounted Floodlight Unit

MAKE NIGHT HOURS PAY with NITE-HAWK

Four 80,000 c.p. flood lights raise to 8½ ft.—aim in all directions. Control panel has duplex receptacles for extension light and power tool lines—voltage regulator—circuit breakers—fused circuits.

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Powered by Wisconsin 4 cylinder, air-cooled engine

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mined by law. For in the case at bar, the contractor chose arbitration as the method of settling disputes between them, and the agreement to that effect may be relied on by the latter to preclude the maintenance of a third-party action at law against it."

(1) Knolls Co-Operative, Inc. v. Hennessy, 150 N.Y.S. 2d 713.

Surety Held Not Liable For Loans for Labor Pay

A bank that has loaned money to a contractor for the purpose of paying for labor has no claim against the surety that has furnished the performance bond.

The point was discussed recently by the Supreme Court of Maine in the following case.

P. E. Susi & Co., on November 5, 1952, entered into a contract with the State Highway Commission of Maine, to supply all equipment, appliances tools, labor and materials required for the construction of part of a road. The contractor furnished a performance bond. As the work progressed, the contractor borrowed money from a bank with which to meet its payrolls. The loan was not repaid and the bank instituted a proceeding to determine whether the surety was liable to the bank for the money advanced by it to the contractor to meet its payrolls. The court held that the surety company was only liable to the parties who had furnished the labor and materials.[1]

The surety bond provided for the performance of the work and for the payment in full of all bills and accounts for material and labor used in the work and all other things contracted for or used in connection with the contract. Quoting from 43 Am. Jur., page 885, Sec. 144, the court stated: "Ordinarily, such bonds must be conditioned not only for faithful performance of the contract of indemnification of the obligee municipality or public body, but also for the payment of the claims of laborers and materialmen performing services and supplying materials in the prosecution of the work."

The court indicated that at the time the surety bond was furnished, the surety company had no knowledge of the loans nor was there any assignment to the bank by the laborers or materialmen. Under such circumstances, the court held that the bank had no claim against the surety company for loans made to the contractor.

(1) Newport Trust Company v. Susi, 134 A. 2d 543, Supreme Judicial Court of Maine, August 30, 1957.

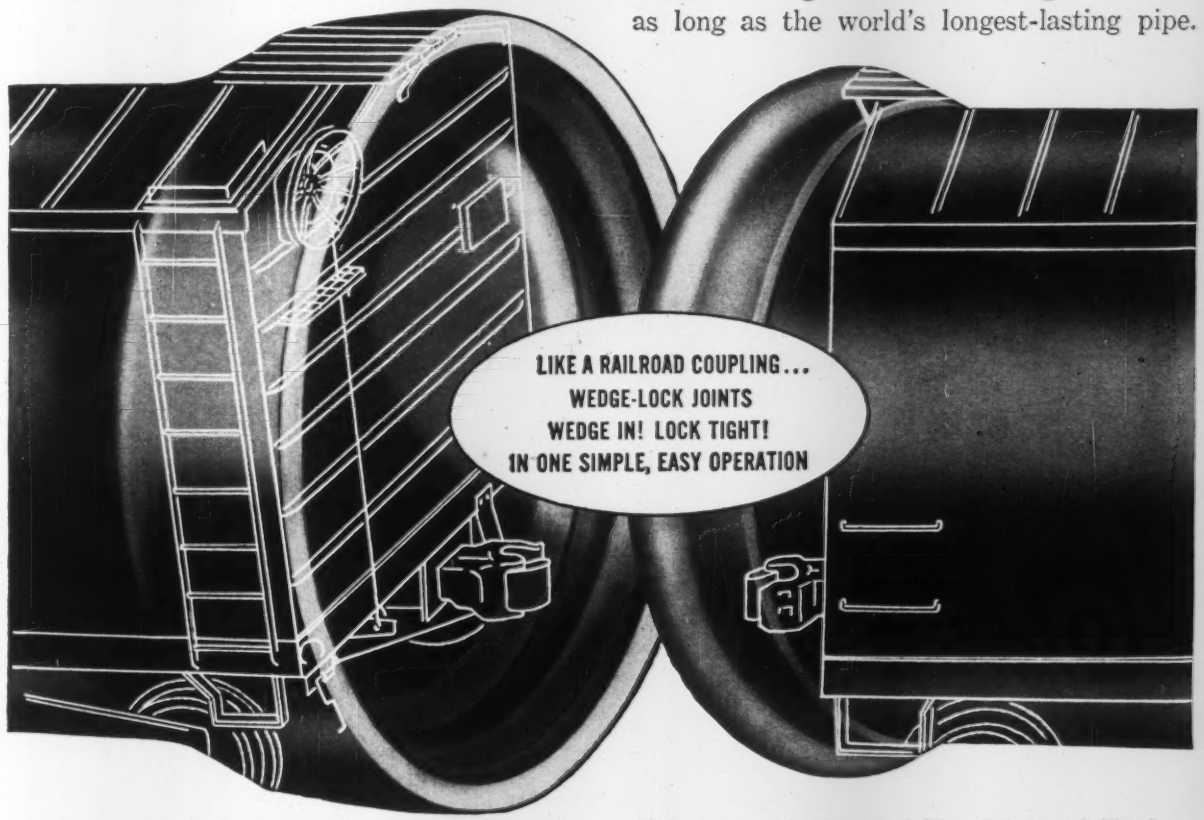
These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.

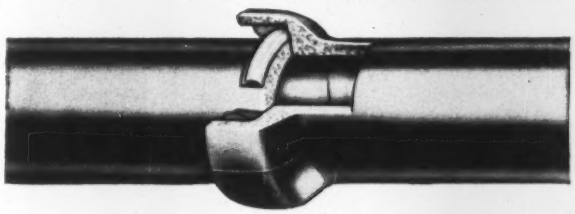
NEW Wedge-Lock* JOINTS

WEDGE IN! LOCK TIGHT!

Stop Infiltration and Roots

Patented Wedge-Lock Joints wedge in and lock tight in one simple, easy operation . . . in continuous compression . . . provide the tightest line . . . stop infiltration and root penetration . . . give easier, faster installation . . . keep installation costs down . . . permit strict adherence to engineered sewer designs . . . last as long as the world's longest-lasting pipe.





Always specify Vitrified Clay Pipe with Wedge-Lock Plastisol Joints.

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The Evans Pipe Company, Uhrichsville, O.
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The Logan Clay Products Company, Logan, Ohio
Oconee Clay Products Company, Milledgeville, Ga.
Pacific Clay Products, Los Angeles 54, Calif.
Pine Hall Brick & Pipe Company, Winston-Salem, N.C.
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The Robinson Clay Product Company, Akron 9, Ohio
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WLC-158-31

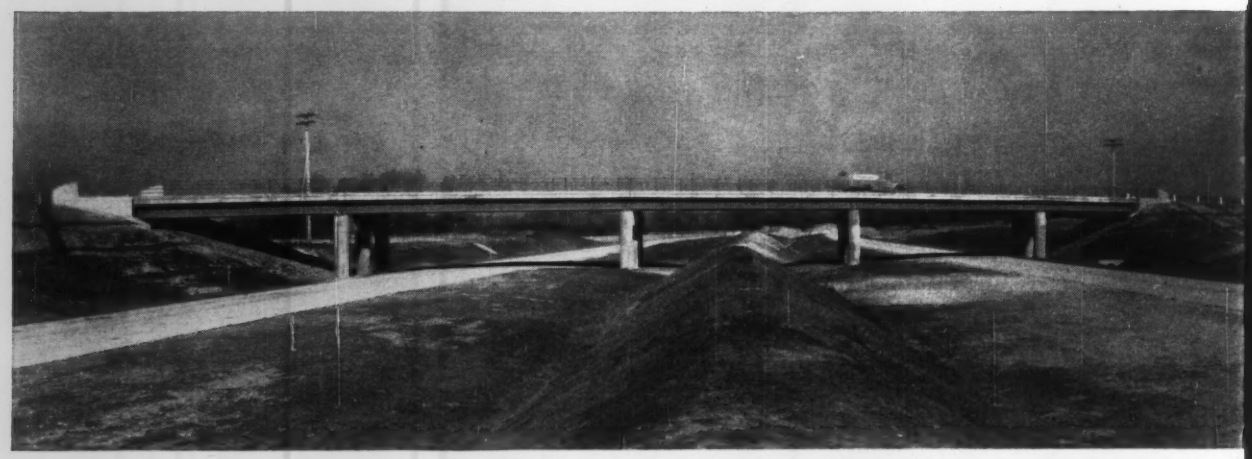
Steel bridges speed completion

8 WORKING DAYS

Pontiac Road Bridge, near Angola, N. Y., 432′ long. Five beam spans—67′ 7-13/16″, two of 101′ 3⅝″, 96′ 3⅝″, and 61′ 7-13/16″. 314 tons of structural steel erected by American Bridge in 8 working days.

7 WORKING DAYS

Evans Center-Eden Road Bridge. 320′ long. Five beam spans—45′ 10-9/16″, three of 74′ 9⅛″, and 44′ 10-9/16″. 175 tons of structural steel erected by American Bridge in 7 working days.



Steelwork by American Bridge puts you days and dollars ahead!

Steel goes up fast. Steel can take rough handling. It's light in ratio to its strength. It fits in the field. This adds up to speedy erection.

Steel is strong and tough. Steel permits long spans and has great capacity to absorb abnormal loads or impacts. When pushed beyond capacity, steel will yield without breaking, providing a vital safety factor.

Steel is easy to connect. Steel can be riveted, bolted or welded. And it fits precisely.

Steel structures can be altered readily . . . during or after construction.

Steel saves shipping, handling and storage costs. With steel, there is less weight and bulk to ship. It can be stored compactly, saving valuable space.

Steel can be accurately inspected . . . during manufacture, during fabrication, during erection, and years after installation.

# of New York State Thruway

7 WORKING DAYS

Angola-Brant Road Bridge. 356′ long. Five beam spans—57′ 8¾″, two of 82′ 7½″, 76′ 9½″, and 50′ 8¾″. 251 tons of structural steel erected by American Bridge in 7 working days.

Erecting a bridge a week is far from a record. It's simply what the job called for and it demonstrates that steel goes up fast even under routine working conditions. This kind of performance is a must if the national highway program is to be carried out according to plan.

But speed is only part of the story. Economy and stability are equally vital. And structurally or economically, steel remains the best material for bridge construction.

Structural steel is manufactured to precise, long established standards. Steel is extremely strong, can take rough handling, permits long spans and saves weight. Steel is tough, can absorb abnormal loads and impacts. Steel is workable—you can punch it, shear it, drill and weld it. Steel fits precisely and gives you a choice of connections. Steel saves freight costs and storage space. Steel can be erected in any season—it can be *accurately* inspected at any time.

Steel, in short, will serve you best.

- **Contractor:** Yonkers Contracting Company, Yonkers, N. Y.
- **Designer:** New York State Department of Public Works
- **Owner:** New York State Thruway Authority

American Bridge
Division of USS United States Steel

General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge · Atlanta · Baltimore · Birmingham Boston · Chicago · Cincinnati · Cleveland · Dallas · Denver · Detroit · Elmira · Gary · Houston · Los Angeles · Memphis · Minneapolis New York · Orange, Texas · Philadelphia · Pittsburgh · Portland, Ore. · Roanoke · St. Louis · San Francisco · Trenton
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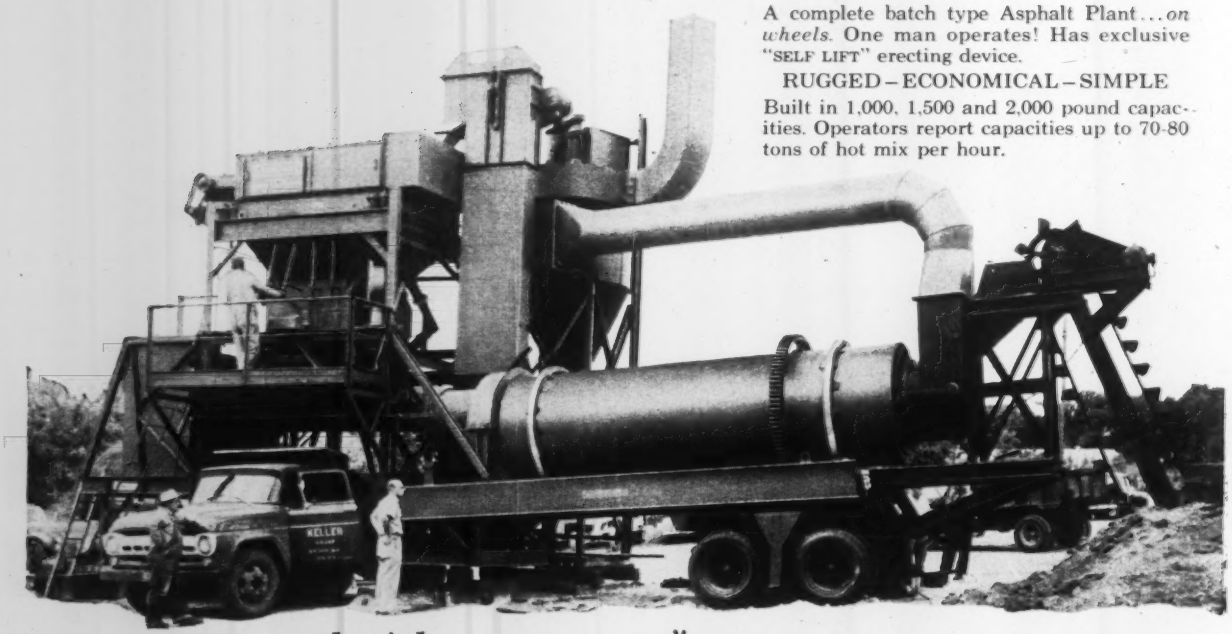
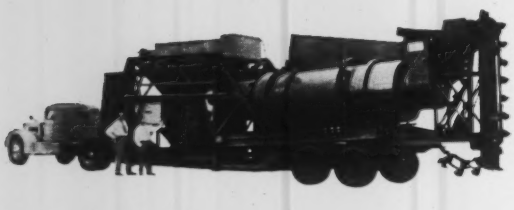
A complete batch type Asphalt Plant... *on wheels*. One man operates! Has exclusive "SELF LIFT" erecting device.

RUGGED—ECONOMICAL—SIMPLE

Built in 1,000, 1,500 and 2,000 pound capacities. Operators report capacities up to 70-80 tons of hot mix per hour.



on the job...



on the way...

* STANDARD Model T-M *Trailer Mounted* asphalt plants offer the same rugged design features as the larger STANDARD Model R-M semi-portable asphalt plants, including: Super-Lift Dryer with Saw-Tooth Lifters... Hi-Speed Mixer, Heavy Duty Design... Simplex Pushbutton Batching Control... positive control of liquid asphalt, and complete accessibility... with everything mounted and packaged in its own rugged trailer frame. Field proven for a number of years, the Model T-M is designed for extreme portability and top capacity.

The massive Standard Model T-M Trailer Mounted Asphalt Plant is the contractor's answer for on-the-job mixing in rural areas and remote locations. Push button erection. Complete plant can be set up and started in less than 8 hours. Here's the toughest, largest, most economical Trailer Mounted Asphalt Plant in the world.

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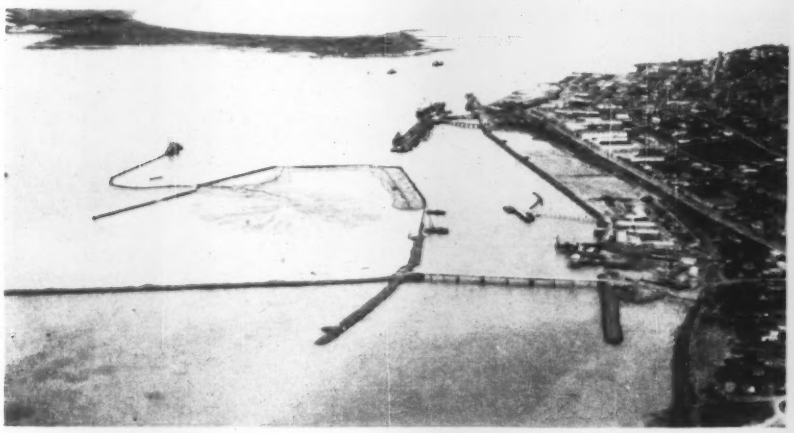


New Zealander s Dredge Up an Island . . .

. . . To Create New Ship-Berth Area

A sand fill is being dredged into the harbor of Bluff on the South Island of New Zealand, to create more ship-berthing space. And the walls enclosing the fill afford an opportunity to study load effects as dredging proceeds.

An 84 acre island is being created to make space for five new berths initially at a cost of $9 million. Work on this phase started in August, 1956, and is due for completion in 1960.

Bluff Harbor is a natural 14,000 acre expanse of water, with minimum channel drafts maintained at 21 ft. It affords ample water area for shipping, but its rocky shoreline makes construction of berthing facilities particularly difficult near shore.

The decision to dredge up an island was made by the Bluff Harbor Board's Chief Engineer D. E. S. Mason. Noel Gedye is the design engineer, and the constructors are four French companies.

A convenient sandbar 100 yd from one end of the existing main wharf was chosen as site for the man-made island. And to avoid unduly disturbing existing flows and siltation patterns in the harbor, it was decided to build a bridge to this new island, rather than a fill causeway. A 590 ft reinforced concrete rail and highway bridge will be constructed.

• **Sheetpiles retain sand**—The island is being formed with 3 million cu yd of sand dredged from the berthing areas and a turning basin area. Sand is to be retained by rubble walls and sheetpile wharves. Steel sheetpiling will be driven until its top is at low water mark, and there it will be tied into a reinforced concrete relieving platform with a concrete retaining wall to deck level. This design made possible shorter length of sheetpiles.

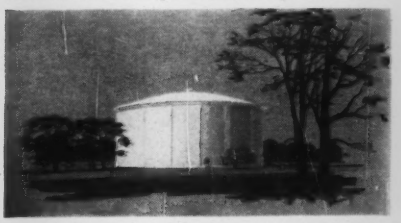
(*Continued on page 126*)

Prestressed Concrete Tanks Show Big Savings

Maintenance Costs Cut By 75%

Over a 50 year service life, a prestressed concrete tank will show a 75% saving in total maintenance costs over a steel tank of the same capacity. In today's economy, such a long range saving has tremendous appeal to municipalities and water companies throughout the world. When your tank requirements are in the planning stage, these calculated maintenance costs should be considered. Average yearly maintenance on a 3,000,000 gallon steel tank is estimated at $2500 per year at current prices. For a prestressed concrete tank, maintenance is negligible; however, occasional painting for color effect may be desired.

When the charges for servicing the initial cost plus relative maintenance allowances are plotted, the prestressed



concrete tank will often show a lower out of pocket cost to the owner in less than 5 years. When these costs and their increases are extended for an expected service life of 50 years, the savings to the owner with prestressed concrete are enormous.

The prestressed concrete tank is also a good looking tank . . . it is inherently strong and extremely stable . . . it is designed and built for permanence.

And, 75% of the contract price is spent right in your local community . . . construction is done with materials and labor available locally.

Write today for more information on Preload Prestressed Concrete Tanks.

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The first installation of an open steel grid flooring on any bridge in the world was made in 1932, on the University Bridge, Seattle, Washington, by the Irving Subway Grating Co. The previous solid pavement on the bridge had been plagued by frequent repairs and accidents.

After 24 years this decking is still in service on the Seattle Bridge. It has had no major repairs and has never even been painted. Not a single accident has occured due to the bridge flooring.

Since then, 80% open Irving Decking has been used advantageously on hundreds of other bridges.

This remarkable record of service speaks for itself.

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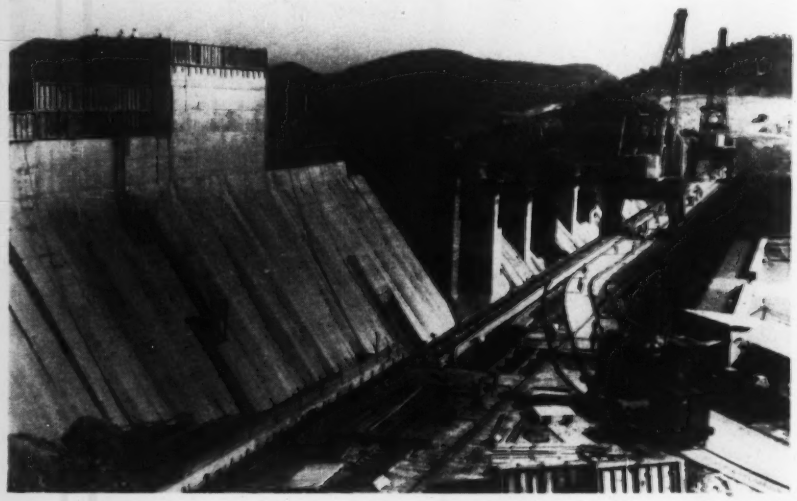
It is planned now to carry out full-scale tests to determine actual stresses in this sheetpile and the concrete walls that top it. Loads on batter piles and tie rods will be measured and actual stresses will be checked against design values. Electric strain gages will be used.

Varied positions for testing will permit comparisons between a wall deriving its passive resistance from stiff clay and one held in fine sand.

• **Rock breaker deepens channel**—A separate part of the berthage plan involves widening of the harbor's entrance channel and deepening it to 35 ft for full width. This work entails the breaking and removing of 30,000 cu yd of rock along 3,000 ft of channel.

The channel work is being done by a specially designed rock breaker assisted by a bucket dredge. Rock is broken by a 15 ton steel ram, raised and dropped 10 ft, four times each minute, to punch a pattern of holes at 3 ft centers in each direction over the area to be dredged.

When finished, there will be two 525 ft berths dredged to 26 ft depth and three 700 ft berths each 35 ft deep.



Maithon Dam in India's TVA Is Completed

One of the first dams in India to be constructed by all-Indian forces using mechanized construction equipment was recently dedicated. It is 162 ft high Maithon Dam, the fifth major structure to be completed of six that form the $200 million first phase of India's TVA—the Damodar Valley Project. The last and largest structure, Panchet Hill Dam, a 3 mile earthfill 133 ft high, is scheduled for completion this year.

Completion of Maithon represents a notable conquest for Indian dambuilders over a difficult diversion situation and some rather poor rock encountered during excavation of penstocks and an underground powerhouse, the first such in East Asia. The dam comprises a 2,060 ft rolled earthfill across the main channel of the Barakar River (just upstream from its confluence with Damodar), a 618 ft concrete spillway on the right bank across a diversion channel, and 12,500 ft of flanking earth embankments. The main earth dam rests on a deposit of sand and silt a maximum of 70 ft above bedrock through which one row of steel sheetpiling is driven as a cutoff.

• **Early challenge**—Construction was highlighted by the concurrent excavation of 1.5 million cu yd of earth and rock for the spillway channel and placement of 2.5 million cu yd of earth in the main channel in an eight month period. After a diversion tunnel had been driven in a hill on the left bank to accommodate the first year's dry weather flow, the Indians had eight months to bring the main embankment up to a level that would not be flooded during the monsoon season and to prepare the diversion channel on the right bank to pass the monsoon discharge.

Heavy equipment and big job know-how (supplied in part by Harza Engineering Co., Chicago job consultant) were required to master this early challenge. The Indians excavated with shovels and loaders, moved and placed

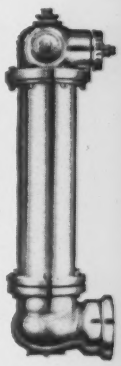
Our representative can explain to you how simplicity of design minimizes maintenance—and to see the R. D. Wood Hydrant you needn't leave your office chair.

"Don't Get Up! Sit Right Where You Are and Let Me Show You the R. D. Wood Hydrant"

"With this scale model I can show you why the R. D. Wood Hydrant has earned its reputation for reliability, strength and permanence. It is simple in construction, too—a fact that makes it low in cost and easy to repair in case of accident.

"The full area main valve is cone shaped to prevent water hammer. It opens *against* water pressure, so that if it is broken in a traffic accident, water pressure will hold it closed. This prevents loss of water, lowering of water pressure, and flooding."

Would you like to see it? Our representative will bring in a scale model and show you its advantages right in your office. Drop us a line today and he will telephone you for an appointment at your convenience.



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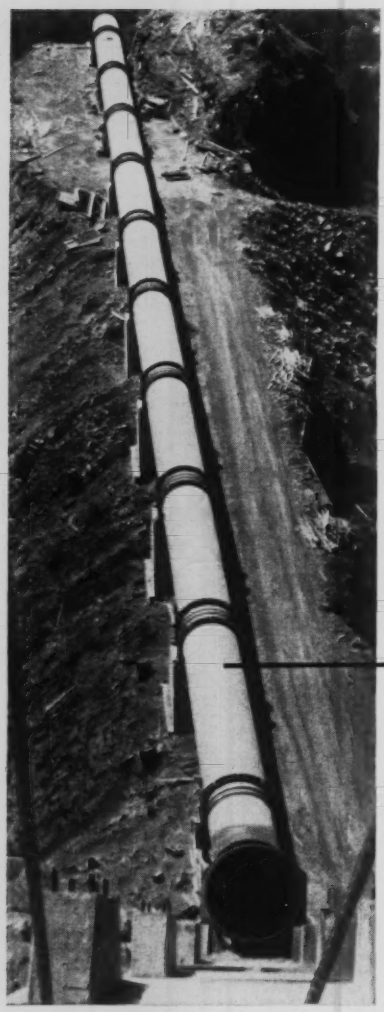
Public Ledger Building, Independence Square, Philadelphia 5, Pa.

Manufacturers of Mathews Hydrants and "Sand-Spun" Pipe (centrifugally cast in sand molds)



Each Dresser Coupling is engineered to meet the pressure at each portion of the penstock

CALIFORNIA-OREGON POWER COMPANY... another 100% Dresser-Coupled penstock

Near Yamsay, Oregon, you'll find another impressive argument for using steel-pipe penstocks and Dresser Couplings. The line is 100 percent Dresser-Coupled... the only type of joint which could be individually tailored to the pressure requirements at each portion of the penstock.

Up to 25% lighter

The Dresser method saves money by permitting the use of lighter wall, high tensile steel pipe. Weight savings can amount to 25 percent... resulting in lower freight and handling costs, lighter equipment on the job. There are no fussy lining-up operations. The flexibility of the Dresser Coupling compensates for slight misalignments caused by grade variations. With the Dresser method, you get a stress-free line, bottle-tight for life.

If you'd like to see technical data on a number of other Dresser-Coupled penstock installations, write for illustrated brochure. Before you draw up specifications, make sure you have all the facts on steel pipe joined with Dresser Couplings.

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DRESSER MANUFACTURING DIVISION

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with dump trucks and utilized a modern array of bulldozers, graders and rollers for spreading and compaction.

The concrete operation was fully mechanized, including a crushing and screening plant, conveyor transportation to batch plant, weigh batching, rail transportation of concrete buckets to a trestle bridge and placement from there by two electric whirler cranes.

• **Underground plant**—The project's underground powerhouse utilizes a portion of the diversion tunnel as the tailrace. The generator vault is 236 ft long, 45 ft wide and 67 ft high and houses three 20,000 kw turbo alternators that operate under a normal gross head of 115 ft (maximum 150 ft).

As cavern rock was excavated it was found to be highly laminated and, when exposed, shrunk and flaked off. So original plans to build only a false wall around the machine room were discarded in favor of lining the entire chamber with reinforced concrete. Originally only the roof was to be concreted.

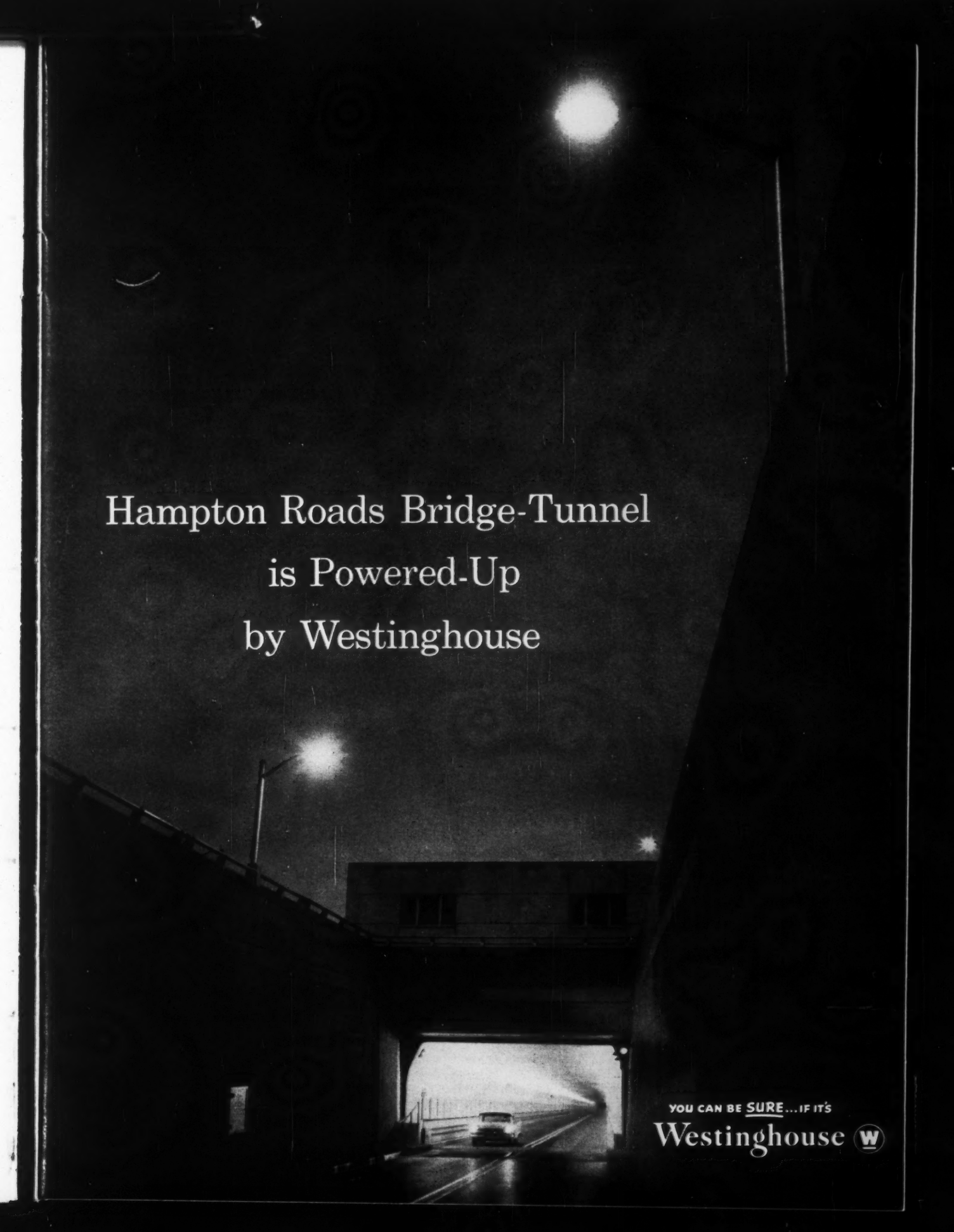
Water seepage and loose rock plagued the penstock excavation. Extensive grouting counteracted the former difficulty, while the huge boulders that kept falling in the tower intake work area finally were stabilized by scaling and air-placed concrete.

Maithon Dam, for flood control and irrigation as well as power, was built by the Damodar Valley Corp. at a cost of $35 million (164 million rupees). DVC, equivalent in many respects to the Tennessee Valley Authority, is developing the entire 330 mile long valley that terminates in the port city of Calcutta on the eastern side of the Indian peninsula (ENR April 12, 1956, p. 53 and May 24, 1951, p. 33).

Canadian Contractors Ask Changes in Tax Policies

Canadian contractors, represented by the Canadian Construction Association, are asking the government to change its tax policies for construction companies.

The CCA wants contractors to have a choice in how they report profits from unfinished contracts in income tax returns. It believes that they should have the option of using either the "completion" or "progress" method of reporting these profits. The option currently is restricted to contracts completed within two years. The CCA, in the same brief, asked that holdbacks, or retainage, not be considered "income" by the National Revenue Department until payment actually is received by the company. The final


Hampton Roads Bridge-Tunnel
is Powered-Up
by Westinghouse
YOU CAN BE SURE... IF IT'S
Westinghouse

Hampton Roads Bridge-Tunnel Links Virginia Peninsula with Norfolk

Westinghouse Electrical Equipment is Used Throughout

The bridge-tunnel recently opened across Hampton Roads, between Newport News and Norfolk, Virginia, features many "firsts" in engineering and construction. Among the most interesting of these are the specially engineered uses of electrical power for illumination, ventilation and other required services.

Both bridge and land approaches to the new 7,479-foot portal-to-portal tunnel are lighted with Westinghouse OV-20 mercury vapor luminaires, controlled from the central control panel. The interior of the tunnel is lighted with special Westinghouse fluorescent luminaires—employing enough fluorescent tubes to provide a single uninterrupted light line three miles long. Double rows of these fixtures provide high-intensity lighting at the tunnel portals, while the central portion of the tunnel uses a single row of lights on each side. Lighting intensities at both tunnel openings are controlled in relation to the daylight or darkness outside, so no abrupt visual adjustments to varying light conditions are required when entering or leaving tunnel. Special Westinghouse saturable reactors and controls were developed to provide this important lighting technique. The entire length of tunnel is so well illuminated that motorists will be able to switch off their lights while driving through it.

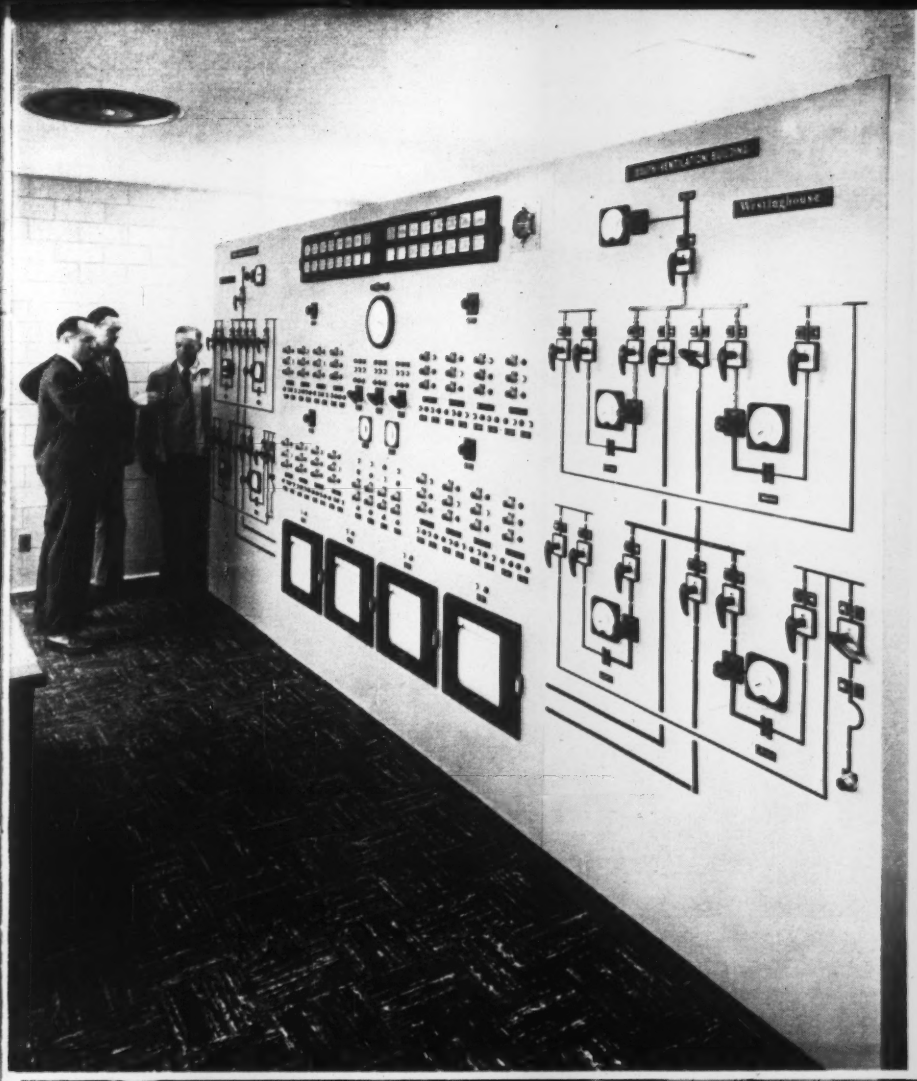
Special Westinghouse equipment controls sixteen vane-axial ventilating fans, eight at each end of tunnel, with a total circulating capacity of 3,408,000 cubic feet of air per minute. Eight fans supply fresh air to tunnel while the other eight exhaust contaminated air. Pitch of fan blades is variable and remotely controlled to permit accurate regulation of air volume handled by each fan. All fan operation is coordinated and controlled at central control board where four carbon monoxide recorders provide a constant check on the concentration of this gas throughout entire length of tunnel.

The entire electrical power requirement of tunnel

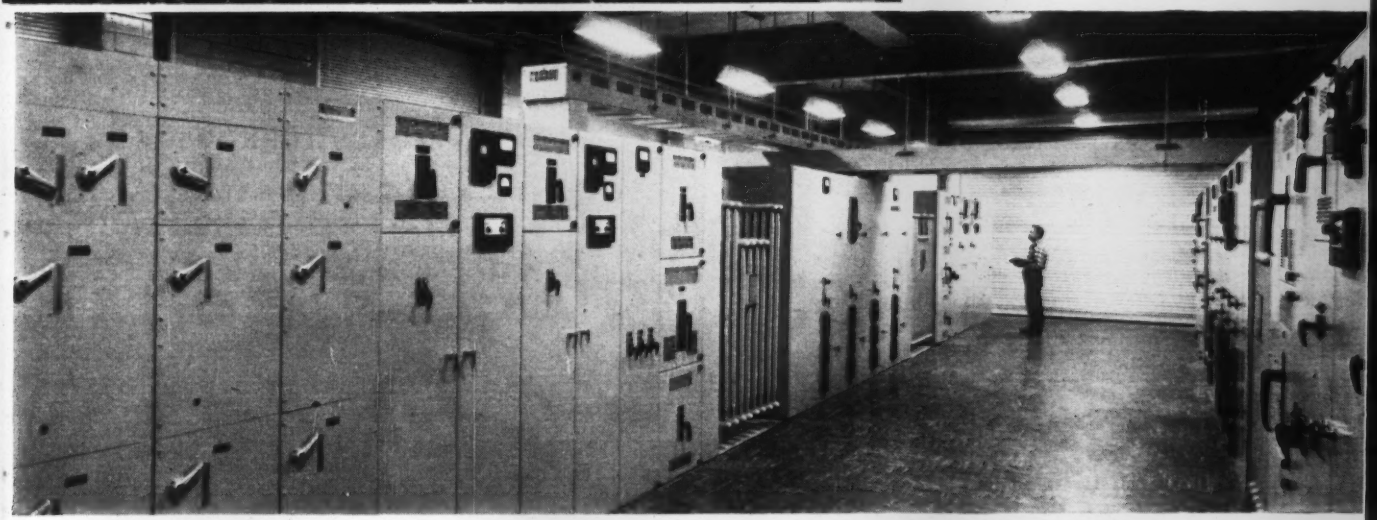
(cont'd)

Tunnel is lighted with special Westinghouse fluorescent luminaires installed in protective tubes of pyrex glass. Special bronze fixtures were provided by Westinghouse to mount lights and protective tubes and to facilitate cleaning and replacement.

Intensities of tunnel lighting are varied by means of saturable reactors. Also included in installation are lighting supply transformers and constant current regulators to control bridge and approach lighting. View of transformer room shows John L. Taylor of E. C. Ernst, Inc., Electrical Subcontractors and Engineers, and William G. Phillips, Westinghouse Service Engineer. J-94089



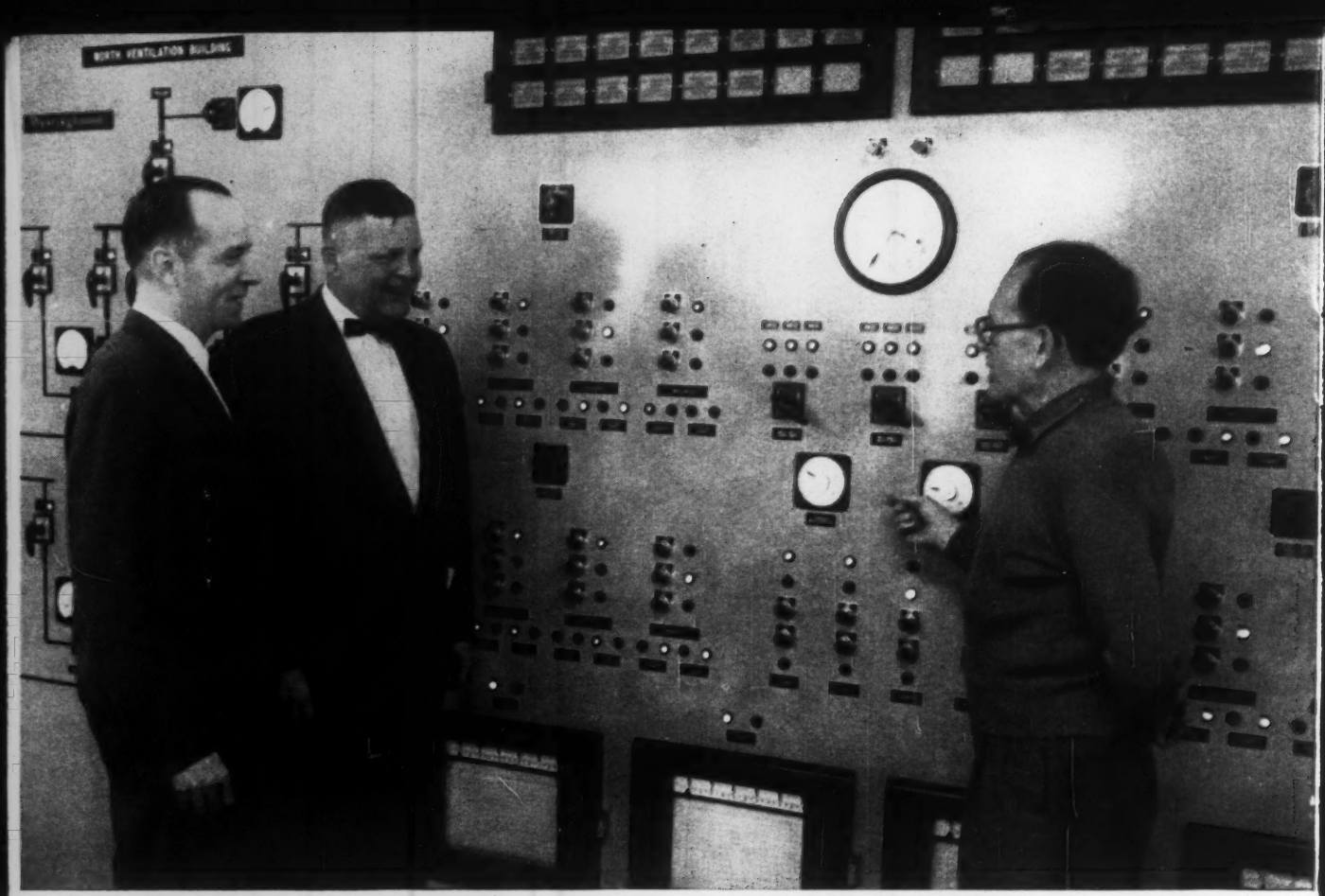
A Westinghouse special master tunnel control board allows operator to supervise tunnel operation from central point. Both tunnel illumination and ventilation are controlled from this board. Ventilating rates can be adjusted by varying number of supply and exhaust fans in operation and by changing fan speed and blade pitch to increase or decrease fan capacities. Also incorporated are alarm indicators, carbon monoxide recorders, time switches and other indicating and control devices. M. B. Trimble, Westinghouse Construction Sales Engineer; James McMahan, Bridge-Tunnel Superintendent, Virginia Department of Highways; and Harry D. Mahoney, Engineer, Parsons, Brinckerhoff, Hall and Macdonald, Consulting Engineers, discuss control board.



Westinghouse double-ended power centers utilize 1000-kva Inerteen®-immersed power transformers. Incoming power service enters metal-clad switchgear located between step-down transformers. Close-coupled to transformer secondaries are low-voltage switchgear assemblies, special fan control cubicles and control centers for tunnel auxiliaries.

J-94089

YOU CAN BE SURE...IF IT'S
Westinghouse



Close-up of center of tunnel control board shows M. B. Trimble, Westinghouse Construction Sales Engineer, with Maurice N. Quade and J. O. Bickel of Parsons, Brinckerhoff, Hall and Macdonald, Consulting Engineers, Designers and Supervisors.

is supplied through four identical Westinghouse 2000-kva power centers, two in each ventilation building on man-made islands at each end of tunnel.

This is another example of how Westinghouse can help engineers and contractors satisfy electrical distribution requirements. For information applying to your specific needs, see your Westinghouse electrical construction engineer. Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

J-94089

YOU CAN BE SURE...IF IT'S Westinghouse

Bridge approach to south end of Hampton Roads Tunnel. Illumination for both approaches is provided by Westinghouse OV-20 mercury vapor luminaires controlled by time switches and photoelectric relays.

Owner: Commonwealth of Virginia—Department of Highways

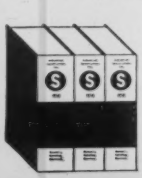
Consulting Engineers: Parsons, Brinckerhoff, Hall and Macdonald

General Contractors: Merritt-Chapman & Scott Corp.
(Approach bridges, portal islands, cut-and-cover sections, underwater tunnel)

Tidewater Construction Corp.
(Portal approaches, ventilation buildings, mechanical and electrical work)

Electrical Subcontractors: E. C. Ernst, Inc.

Over 250 Pages Westinghouse Data in Sweet's Construction File.



recommendation in this brief was that the department "remove its unrealistic present distinction between unit price and lump sum contracts".

The second brief to the department advocated that the capital cost allowance on contractors' equipment be increased to 50% from the present 30% rate.

Russia and Norway Sign Hydro Power Agreement

Russia and Norway have agreed to build four hydroelectric power stations on the Pats River border between the two countries, it has been reported in SOVIET WEEKLY.

The Russians are to build three stations: 18,000 kw Purnukoski, 17,000 kw Hevoskorski and the 45,000 kw Borisoglebsk. The Norwegian station at Skugfoss is to have a 64,000 kw capacity.

Saudi Arabia To Build First Sewage Treatment Plant

Saudi Arabia's first complete municipal sewage disposal system and treatment plant—for the Persian Gulf port of Dammam—soon will be under way by a local contractor. The Dutch firm of Dorr-Oliver N.V. has been retained to design the plant and supply all required equipment.

The complete system and plant, costing approximately $3.5 million, will cover the city's needs through 1967.

Bids Open For First Stage Of Buenos Aires Port Work

Bids have been asked by the Argentine Port Construction Administration for the first stage of a $22 million project that will modernize Buenos Aires' port facilities.

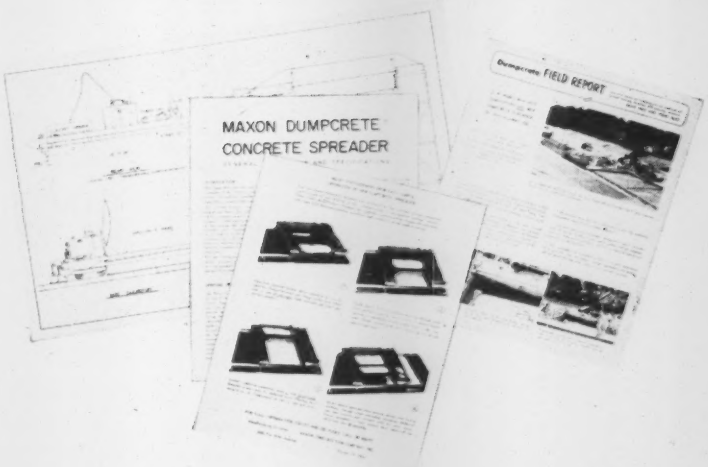
While the complete project includes construction of piers for the berthing of five ocean liners, present bids covering the most urgent item call for only about $1.1 million to revamp a 3,000 sq yd passenger area.

Montreal Harbor Continues $60 Million Improvement

An estimated $20.9 million will be spent over the next two years improving Montreal's harbor facilities under a two-year-old ($60 million) development program.

Work slated for the next two years includes a new 5 million bushel capacity grain elevator system costing $10.5 million and construction of 1,800 ft of concrete wharves. Work completed to date under the improvement program totals $23.2 million.

NEW LITERATURE FOR YOU!



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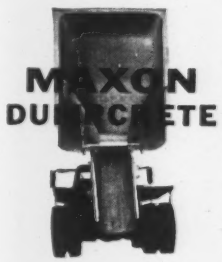
If you're a concrete paving contractor, you'll want specifications, description, test reports, drawings and illustrations of the new Dumpcrete Spreader. Designed to work with low-cost Dumpcretes, the new spreader makes the "central-mixing—non-agitated hauling" concrete method more economical, more flexible and more productive than ever before.



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For complete information on Rugasol, call or write for Bulletin RG-58.

Ad 26-4

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Books

Army Engineers

ROADS, RAILS & WATERWAYS — THE ARMY ENGINEERS AND EARLY TRANSPORTATION—By Forest G. Hill. 248 pp. University of Oklahoma Press, Norman, Okla. $4.00

This book is an account of the part played by the Corps of Engineers of the Army in the development of a transportation system for this country in the half century between the War of 1812 and the Civil War.

The Corps of Engineers was created by an act of Congress in 1802, which directed that the Corps be stationed at West Point and constitute a military academy. During the first 10 to 15 years of its life the Corps was concerned chiefly with coast fortifications and operation of the military academy. But as the nation grew and the western movement intensified, much pressure was put on the Corps to provide engineers for the projected roads, canals and railways as well as for needed improvements in harbors along the Atlantic seaboard.

Civil engineers were in great demand. There were not enough outside the military service to make the needed surveys and to design and build the desired transportation facilities. As a result, the Corps made some of the surveys itself or loaned its engineers to the promoters of canals or railroads. Congress did not object so long as the promoters could show that the project was of national importance. Thus, some of the early surveys for the Baltimore & Ohio Railroad were made by Army engineers and they supervised some of the early track-laying operations.

As may be imagined, there were widely diverse views in Congress as to what constituted "national importance" but the officers of the Corps were liberal in their interpretation of that term because the need for engineering help was great.

The official beginning of the river and harbor work, which for many years has been a major function of the Army Engineers, was the General Survey Act of 1824. The first itemized river-and-harbor bill was passed by Congress in 1826.

Construction Glamorized

THE EARTH CHANGERS—By Neill C. Wilson and Frank J. Taylor. 312 pp. Doubleday & Co., Inc., Garden City, N. Y. $5.00.

This is the story of four of the construction firms that participated in the Six Companies contract for Hoover Dam. It traces Morrison-Knudsen, Utah Construction Co., Bechtel Corp. and the Kaiser companies from their earliest beginnings to triumphs that are still under way. It shows how the paths of the principals became intertwined to lead up to Hoover Dam, which is still perhaps the greatest construction job in history. Then it takes the firms through war and postwar years as they become international industrial giants.

The story of the early years is fascinating as the personalities are developed, including descriptions of Morris Knudsen, Harry Morrison, the Wattis brothers and the Christensens of Utah Construction, W. A. "Dad" Bechtel and his sons, and Henry J. Kaiser.

But somewhere in the middle of the book, the fascination of individual enterprise wears off as the accomplishments of huge corporations are recounted somewhat like a press agent's handout. Certainly, there's an exotic fascination in places such as Kemano in Canada, Ras Tanura in Arabia, Marcona in Peru and in the dozens of other places where these corporate construction giants have worked in recent years. But in telling about them, the authors let their book get a little dull. Perhaps these achievements are too recent to have gathered glamor as has the work at Hoover Dam. More than likely, however, it's because these achievements are carefully calculated efforts of corporate teams rather than of individuals. Nevertheless, the book is highly recommended to heavy construction men.

Unwanted Sound

HANDBOOK OF NOISE CONTROL—Edited by Cyril M. Harris. 1011 pp. McGraw-Hill Book Co., New York, Toronto, London. $16.50

Noise control is covered in comprehensive fashion in this handbook, to which 46 experts contributed.

As pointed out by the editor of the handbook in the first chapter, the objective of noise control is to obtain an acceptable noise environment consistent with economical and operational considerations. Such an environment is of economic importance because of the effect of unwanted sounds on speech communication, efficiency of workers and property values and because high-intensity noise can impair hearing and thus can be grounds for disability compensation.

In the opening chapters, the characteristics of noise are described. Its origin is explored and methods of propagation are discussed. Then, the effects of noise

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How a Four-Man Crew laid 1500 feet a day of

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through Florida swampland

CLOW cast iron pipe, with the sensational Bell-Tite joint, proved its advantages conclusively in this Clearwater, Florida, installation.

That a four-man crew was able to lay this CLOW Bell-Tite pipe at 1500 feet a day under these adverse conditions is definite evidence of the time, labor and money-saving advantages of this CLOW-designed joint. Two men worked in the trench—often in 3 feet of water. One man lubricating and aligning the joints, the other assembling with a pinch bar. A crane operator and a hook-up man completed the crew.

CLOW Bell-Tite forms a pressure-tight joint—instantly—no bolts or follower glands required. Under practically all conditions, it is the fastest, easiest and most economical pipe for water main installation. Underwriters' Laboratories Inc. listed in diameters 3- through 24-inch.

Shows simple assembly of CLOW Bell-Tite joint. Just wipe clean, lubricate and push spigot into the bell. When painted yellow stripe is no longer visible, joint is bottle tight.

Under-water assembly of 8" Bell-Tite pipe at Clearwater, Fla.
Contractor: Hancock Pipe Company, Clearwater, Fla.

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and vibrations on the human anatomy are taken up. The rest of the book deals with noise prevention and control.

Methods for controlling noise are classified into three categories: (1) noise reduction at the source; (2) noise control of the transmission path; (3) protective measures at the receiver.

At the source, noise can be reduced by decreasing exciting forces or the response of noise-radiating components in the system to exciting forces. If this cannot be done, consideration should be given to a change in operating procedures to reduce the noise.

The transmission path can be controlled by siting, building layout, path deflection, enclosures, absorption or impedance mismatch.

If these measures cannot be used to reduce noise to an acceptable level, personnel may have to use earplugs, ear muffs or noise helmets or be placed in a protective booth. Sometimes it may be necessary to rotate personnel in the noisy area so that individuals are exposed only for short periods of time.

These noise-control methods are dealt with in detail in the major portion of the handbook. However, related but equally important subjects are handled in the final chapters, such as community noise and city planning, legal aspects of the aircraft noise problem, anti-noise ordinances and noise-control requirements in building codes.

Classic Abbreviated

ELEMENTS OF WATER SUPPLY AND WASTE-WATER DISPOSAL—By Gordon M. Fair and John C. Geyer, 615 pp., John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $8.95.

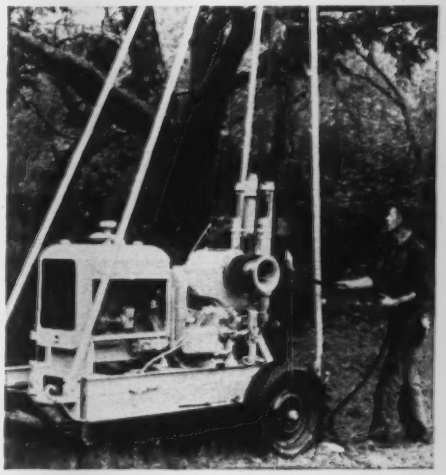
A condensed edition of the authors' earlier Water Supply and Waste Disposal, this book is aimed at the undergraduate civil and sanitary engineering student. It emphasizes the basic principles of water supply and waste disposal. Discussing both subjects jointly rather than as separate entities, duplication is avoided. The first half of the book is devoted to collection and distribution of water and the collection and distribution of waste water. The second half discusses the behavior of natural waters and the treatment of potable water and waste water.

In Layman Language

MIRACLE BRIDGE AT MACKINAC—by David B. Steinman, in collaboration with John J. Nevill. 200 pp. Wm. B. Eerdmans Publishing Co., Grand Rapids, Mich. $4.50.

The new bridge across Michigan's

ACKER DUAL-PURPOSE CORE DRILL AIDS FEDERAL HIGHWAY PROGRAM



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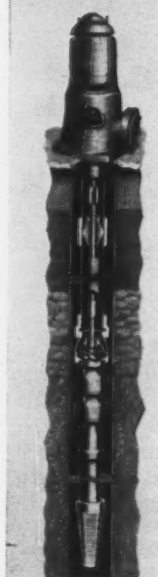
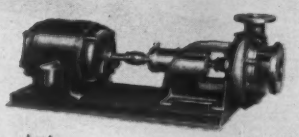
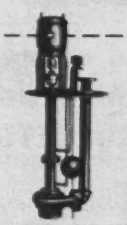


VERTICAL TURBINE PUMPS . . . for wells 4 to 16 inches I.D. Capacities 15 to more than 3500 G.P.M. Bulletin No. 4700.



END-SUCTION CENTRIFUGAL PUMPS . . . two ball bearing type. Semi-open non-clogging impeller. Separate liquid end in standard iron or corrosion-resistant material. Optional features adapt to many requirements. Bulletin 4011.



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Mackinac Strait is one of the great suspension bridges of the world. And this book is its story from early beginnings to final completion.

In the author's preface it is stated that the objective was to present the story in "simple, everyday language that the general reader can grasp and appreciate." This objective has been attained despite what seem too frequent attempts to clothe simple statements of fact in more exciting phraseology.

The book has the good quality of being thorough. Everything about the building of the bridge is explained, and some of the more complicated operations are diagramed. The author, who was the designer of the bridge, has obviously guided his writing collaborator, so that the book can be considered authentic and authoritative. If you want to know in detail how a suspension bridge is built, this is a book to read.

Prestressed Concrete Papers

PROCEEDINGS WORLD CONFERENCE ON PRESTRESSED CONCRETE—583 pp. World Conference on Prestressed Concrete, Inc., Room 216, 417 Market St., San Francisco, Calif. $10.00.

This book contains the complete text of 38 papers given at the conference held in San Francisco last summer (ENR Aug. 8, 1957, p 23). It also contains 26 additional treatises on the subject that were not presented orally. Including papers on prestressed concrete technology in all parts of the world, the proceedings should be a guide for both engineers and contractors.

Books & Pamphlets

• **Desalting water**—A mechanical compression method for removing salt from ice made of brine appears, according to a report on Navy sponsored studies, to be the only one with possibilities of reducing salinity in a single step. The report, PB 121959, *Investigation of Freezing as a Means of Obtaining Fresh Water from Salt Water*, can be obtained for $1.50 from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C.

• **Fire protection**—"The Modern Warehouse" emphasizes fire protection and prevention and is designed as a guide in planning construction of a one-story warehouse. The 18 page pamphlet describes selection of a layout and details of construction for adequate fire protection. The pamphlet is available for $0.50. Associated Reciprocal Exchanges, 2 Park Ave., New York 16, N. Y.

TALL TAILS are no problem...

to **HOWARD H. WRIGHT,** President
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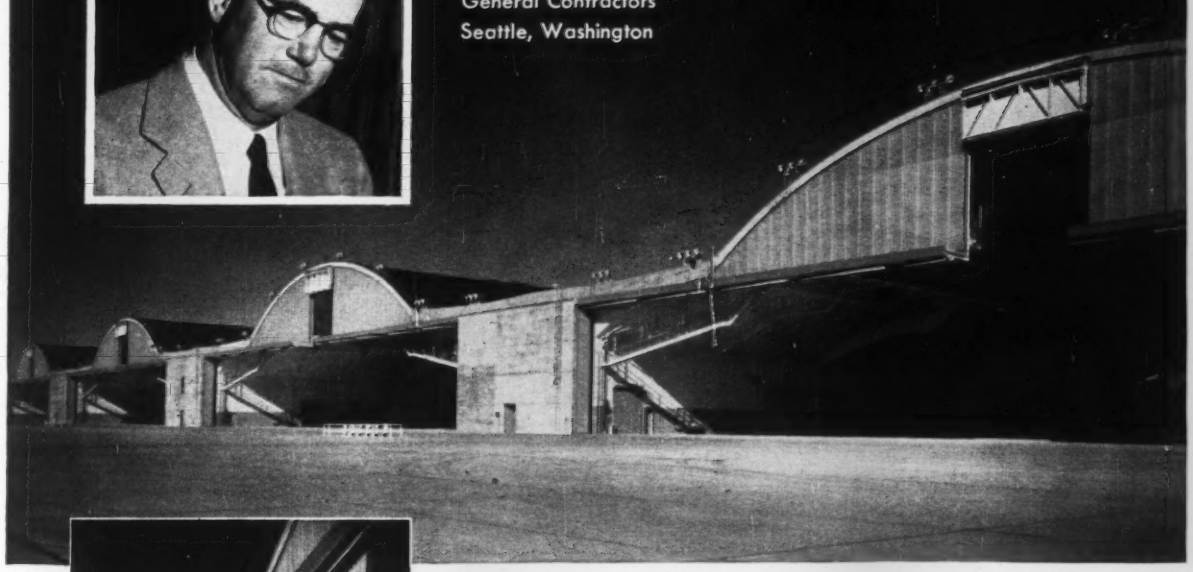

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Aviation Division

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INTERNATIONAL SERVICE

Vernon (Stub) Faber doing a rough grading operation on a highway widening project inside the city limits of Milwaukee, Wis. The machine is an Austin-Western Super 99 with 6-wheel drive and 6-wheel steer.

"I've operated every make of grader and this A-W Super 99 outperforms them all"

says Vernon (Stub) Faber

As a "boomer" grader operator, Vernon (Stub) Faber has spent the past 16 years on construction jobs all over the country. He has run every make of grader under almost every conceivable operating condition. There isn't much he doesn't know about graders.

Here's what Stub Faber has to say about the A-W Super 99. "I've operated every make of grader, and this A-W Super 99 outperforms them all. It's maneuverable, and you can see everything from an Austin-Western—this is very important for finish grading. The A-W actually speeds up a grading operation, because it does not have to slow down for the grading of intersections. I like the A-W for slope grading, too. With the hydraulically controlled blade, you don't have to leave your seat to change the blade and the all-wheel steer gives you a good grip on the slope."

30% more power — extra maneuverability

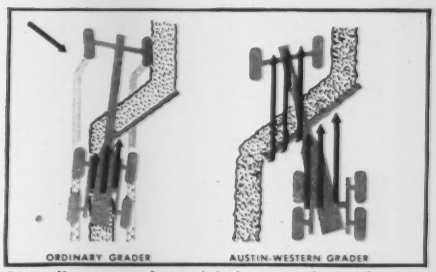
Like the famous A-W 4-wheel machine, the new Super 99 features a unique combination that gives it unbeatable performance. With all-wheel drive, you get sure traction under all conditions, plus 30% more power where you need it — at the blade. All-wheel steer gets the grader where you want it in the shortest time; holds every wheel where the footing is best. Teamed together, all-wheel drive and all-wheel steer let you move more material farther and faster because of directed power on every wheel.

Superior blade control

A-W precision sideshift always puts the blade where it's needed. Ends of the blade stay on the ground with no change in the working angle. For top performance on any bank and un-

equaled reach, the high-lift blade can be operated through the full range of 90° left or right. And because the blade is completely reversible, reverse grading on narrow roads or between forms is easy with use of the rear steer. Precision hydraulic controls, instantly responsive to a finger's touch, speed all blade movements, increasing efficiency and reducing operator fatigue.

Preference for A-W graders is the rule, rather than the exception, among contractors and the experienced operators who know them. You can take an A-W more places, move more dirt, do more jobs, and handle them with less effort than with any competitive machine. As a contractor, you'll want to get the complete A-W story. Write today for free booklet.



An ordinary grader with little material to push moves ahead in a straight line. But when a heavy windrow is tackled, side thrust causes the dead front end to go out of control and slip sideways.

On A-W graders, all-wheel drive and all-wheel steer team up with the blade — the rear drivers push behind the toe of the blade, the front drivers pull ahead of the heel of the blade. As a result, the machine moves straight ahead under perfect control.

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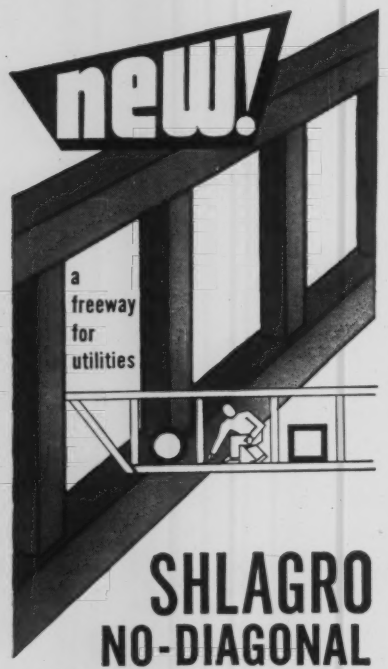

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Honorary Members, Awards Are Announced by AWWA

The Board of Directors of the American Water Works Association at its recent annual meeting awarded four honorary memberships. They went to Morrison B. Cunningham, director of public works, Oklahoma City; Victor M. Ehlers, director of the division of sanitary engineering, Texas State Health Department; Fred G. Gordon, assistant chief engineer of the bureau of engineering, department of public works, Chicago; and Louis F. Warrick, chief of the technical services branch, U.S. Public Health Service, Washington, D. C.

The 1957 Diven Medal for outstanding service to AWWA was awarded to Ray L. Derby of Los Angeles, Calif.

The 1957 Goodell Prize for the most notable technical contribution was awarded H. O. Hartung, St. Louis, Missouri, for his paper, "Calcium Carbonate Stabilization of Lime-Softened Water."

Other honors included division awards: distribution to Jerome B. Wolff, Baltimore; management to H. H. Gerstein, Chicago; purification to Graham Walton, Cincinnati; and resources to H. O. Banks, Sacramento, Calif.

Careers

Public Works

B. N. Hoffmaster has been appointed chief harbor engineer of the Port of Long Beach, Calif. He had been carrying out the duties of that office for the last year during the illness and absence of **R. R. Shoemaker,** who recently died.

Carl W. Wild, vice president of Community Planning Services, Inc., Monroeville, Pa., has been made deputy secretary of the Pennsylvania Department of Highways to head its

(Continued on page 144)

Morrison-Knudsen Gets Seaway Safety Award

Morrison-Knudsen Co., Inc., sponsoring contractor on the Dwight D. Eisenhower Lock section of the St. Lawrence Seaway Project, has received the Award of Honor of the National Safety Council and the top safety award from its insurer, Employers Mutuals of Wausau. The accident frequency rate on the Eisenhower Lock where nearly 2 million man-hours were worked, was more than 80% below the heavy construction average during 1957.

In the photo, left to right, are: Richard Daley, M-K safety engineer; C. A. McGinnis, accident prevention manager for Employers Mutuals; F. W. Braun, vice president of Employers Mutuals; John Armitage, M-K project manager, Ed Eaton, superintendent; and Jack Williams, director of Safety.

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Work performed by Underpinning & Foundation Co., Inc. as sub-contractors to Woodcrest Construction Co. & Wheeler Engineering Co., General Contractors under supervision of Department of Public Works, N. Y. C.

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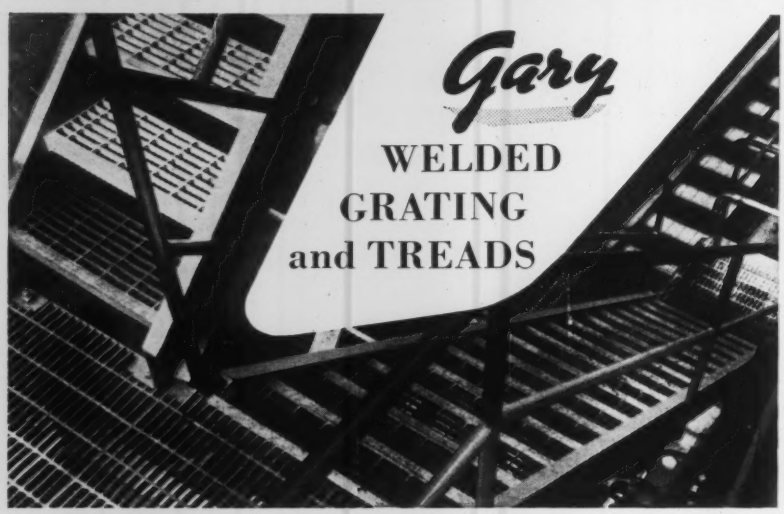

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- OPEN CONSTRUCTION—gives maximum ventilation and illumination. Ask for Bulletin E-38

ROCKWELL SRA

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newly established Office of Planning and Research. His duties will be to coordinate highway planning with other state objectives in industrial development, urban renewal, conservation and recreation.

P. M. Stephenson has been named Oregon assistant state highway engineer to succeed **William Stiffler,** who retired January 1. **Ivan D. Merchant** has been moved up to Mr. Stephenson's old post of bridge engineer.

Retirements

Murray P. Nicol, president of the Struck Construction Co., Louisville, Ky., has retired. Now 73 years old, Mr. Nicol, who helped found the firm in 1921 and who has been its president since 1931, has been in construction most of his life. His firm built some of Louisville's largest buildings.

Harold J. Spelman, regional engineer for the Eastern Park and Forest Region of the Bureau of Public Roads, retired recently after 52-year career in highway work. He was with BPR for 28 years and for nearly 25 years was in charge of what is now the Region 15 office.

Walter O. Hill, for the last 33 years district construction engineer with the Missouri State Highway Commission, retired from state service in February.

Edward Ochs, superintendent of general construction at Ice Harbor Dam for the Corps of Engineers, has retired after 20 years of government service. He has joined the architectural firm of John W. Maloney, Seattle.

Associations

Edward Wenk, Jr., has been elected president of the Society for Experimental Stress Analysis. He is chairman of the department of engineering mechanics, Southwest Research Institute, San Antonio, Tex.

Henry M. Von Oesen of Wilmington, N. C., has been named president of the North Carolina Society of Engineers. He succeeds **John D. Watson** of Greensboro.

Alfred L. Parme is the new manager of the Portland Cement Association's Structural and Railways Bureau, and **Walter E. Kunze, Jr.,** is the new assistant manager. **Thor Thorgermundsson,** former manager, asked to be relieved for reasons of personal health.

John W. Kelly of the Imperial Paving Co., Oklahoma City, Okla., has been elected president of the National Bituminous Concrete Association. He succeeds **Sheldon G. Hayes** of the Cadillac Asphalt Paving Co., Detroit, Mich., who has been president of the group since he helped organize it two years ago.

(*Men & Jobs continued on page 147*)

Man and boy at right dramatize size of this 80' x 360' Stran-Steel building owned by West Jersey Warehouses, Inc., of Bridgeton, N.J. Here is 28,800 square feet of working space.

MASS-PRODUCED FOR SAVINGS... CUSTOM-FITTED TO YOUR NEEDS!

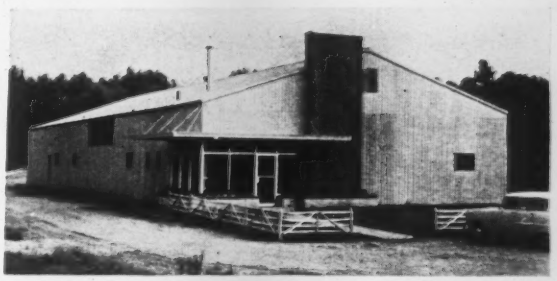
In your next building—factory, warehouse, or retail outlet—get these three big benefits: 100% useable clear-span interior, firesafe all-steel construction and a 5-year payment plan. They're all yours with a Stran-Steel Rigid Frame building!

Wide-Open Interiors Fit Any Floor Plan

The Stran-Steel method of construction means you get top design flexibility. Mass-produced components give you major economies and, at the same time, permit you to tailor your building to the size, function and appearance you specify. Insulates easily, takes cranes or monorails, combines effectively with other materials —like brick, masonry, wood and glass. And Stran-Steel's precision pre-engineering means your site-assembled building goes up in days, stays up for decades with minimum upkeep and operating expense.

Only One-Fourth Down as Your Initial Investment

Without affecting your regular credit lines, you can buy this versatile, durable building through the Stran-Steel Purchase Plan. Pay as little as one-fourth down for the completed structure—including foundation, erection cost and tax—with as long as five years for the balance. Your building works for you as you pay. Mail the coupon now for more information or call your Stran-Steel dealer. He's listed in the Yellow Pages under *Steel Buildings* or *Buildings—Steel.*



Good-looking, hard-working manufacturing plant for Standard Fence Co., Manchester, N.H. Stran-Steel factories can be expanded easily when you need more production space.

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DESIGN NEWS

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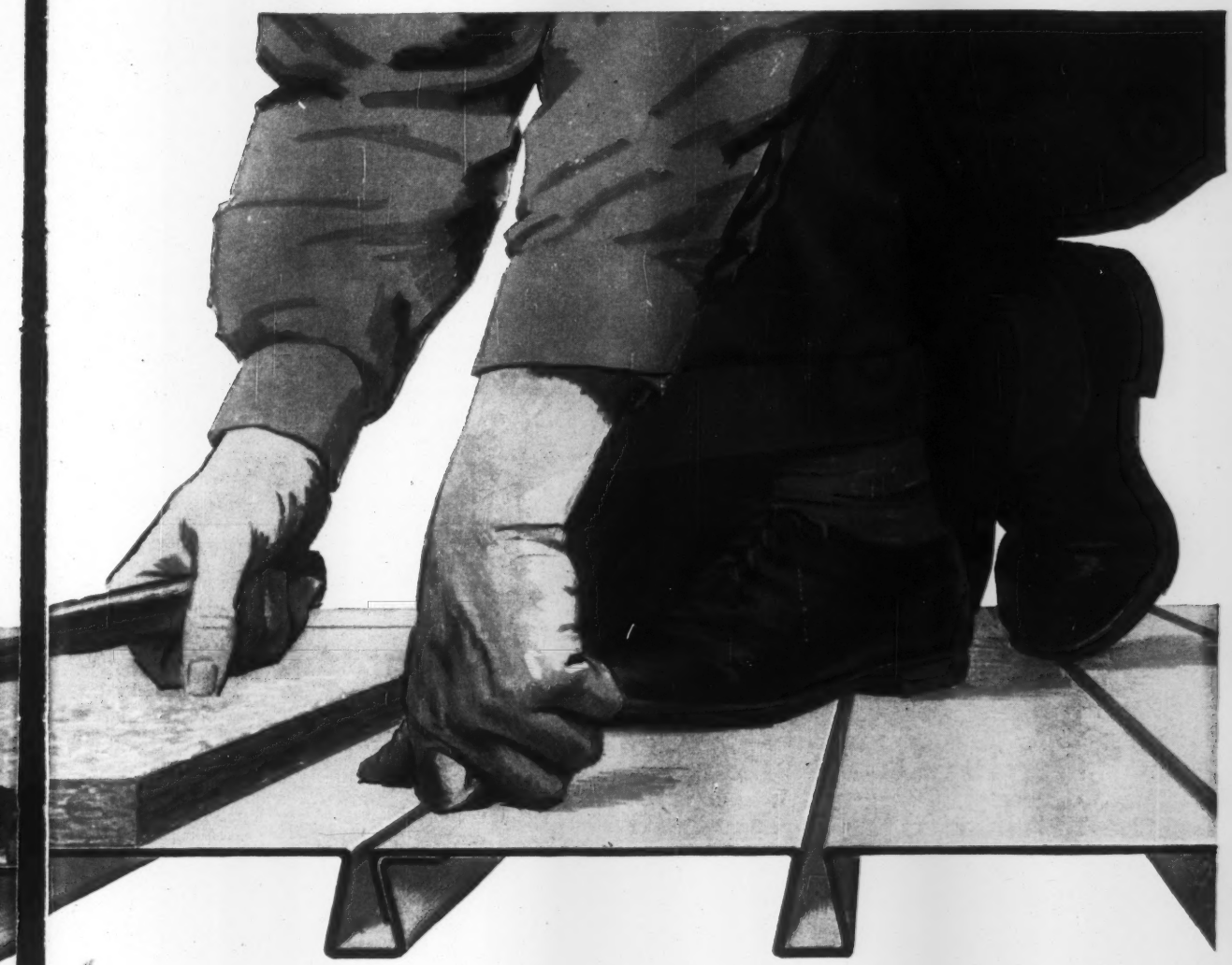
quality standard for steel roof deck!

■ Since its origination in the early '20s as the first insulated roof deck, Holorib has been recognized as the quality design standard for this type of construction. Its exclusive features give you many important advantages.

The pyramidal-shaped ribs which distinguish Holorib provide greater lateral and vertical stability than ordinary designs. This greater strength allows heavier loads on longer purlin spacings. The narrow rib openings—3/8″—give full bonding area and a firm support for insulation as well as allowing a minimum waste of bonding materials. The broad base—1″—rests firmly on the purlins for a balanced structural section and greater welding area.

Holorib design features also speed up construction and provide tight joints to eliminate asphalt leakage. The telescoping end laps provide for expansion and contraction and give positive connection. The side laps interlock with the complete last rib of the adjoining sheet to assure full and equal strength at all points. No side lap fasteners are required. The positive side lap, telescoping end laps and full flange support for the roofing materials above insure proper performance of the entire roof assembly.

Fenestra® Holorib Steel Roof Deck is rolled in lengths that permit economical spacing of purlins and the design advantage of continuity over supports. Full 18″ coverage gives fast erection.



Non-piercing insulation clip now available exclusively for Holorib. This provides fast construction and a positive anchor for insulation when the asphaltic vapor barrier or adhesive is eliminated between deck and insulation.

Be sure to get the quality design and construction advantages of Fenestra Holorib Roof Deck. Specify it exactly . . . there is no equal. Check any alternates for bonding area, strength and stability of section at all ribs, end and side lap details, insulation fastening, and speed of installation. There is no comparison to Fenestra Holorib. For complete details, get your FREE copy of the *1958 Fenestra Building Panel Catalog.* Call your local Fenestra representative—listed in the Yellow Pages—or mail the coupon below, today.

Fenestra Holorib Roof Deck is also available as Acoustical Holorib and as Holorib Reinforcing Forms for concrete construction.

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Make Unusual, Decorative, Suspended Ceilings

Interior decorators constantly strive for a fresh approach to interior design. Tectum acoustical suspended ceilings offer an out-of-the-ordinary texture that is both pleasing to the eye and functional. Not only are sounds absorbed effectively, Tectum is a sturdy board, has a natural rigidity that withstands normal abuse without scratching or deteriorating in any way. You can't punch your finger through this ceiling, nor will it chip, flake, peel or breathe. Its natural off-white coloring needs no further finishing, but it may be painted, if desired, with beautiful effects. Try Tectum on your next office, library, commercial or other busy-area building. Complete information on request—send for Bulletin B-101.

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Obituaries

Bowers Construction Co. of Whiteville and Raleigh, N. C., died at Whiteville February 12. His firm specialized in highway and bridge construction throughout the Southeast.

James M. Conner, 76, a retired civil engineer of Newark, Del., died February 6. A civil engineering graduate of the University of Delaware in 1903, he was a member of the engineering staff of the Baltimore & Ohio Railroad for 47 years, until retirement in 1950.

John L. Pickles, 80, former district engineer and superintendent of the Duluth, Winnipeg and Pacific Railway, died recently at Duluth, Minn. A graduate of the University of Missouri, School of Mines and Metallurgy, he began his engineering career in Texas where he built waterworks systems and railroad facilities at El Paso. He came to the Duluth area 45 years ago.

Clifford H. Sheets, former vice president of the firm of Sheets & Canfield Construction Co., died recently at Lakewood, Ohio. Mr. Sheets, 68, retired as a construction superintendent after serving 15 years with Loesch & Green Construction Co. of Cleveland, Ohio.

James R. Henderson, Sr., 88, former vice president of Stearns-Roger Mfg. Co. of Denver, Colo., died recently at Santa Barbara, Calif. After his retirement from the Stearns-Roger firm in 1924, he maintained a consulting engineering office in Denver for many years.

Charles F. Ryan, former officer of several construction companies in Rochester, N. Y., died there early in February.

J. Sterling Kinney, 48, head of the structural engineering division of Rensselaer Polytechnic Institute's civil engineering department, died January 29 in Troy, N. Y. He was recognized as a leader in indeterminate structural design and was the author of a recently published book "Indeterminate Structural Analysis". A 1931 graduate of RPI and holder of a doctorate in civil engineering, Professor Kinney taught at Rensselaer since graduation, except for four years as design engineer with American Bridge Co.

F. Carl Weigelt, 67, Lake Carmel, N. Y., member of York & Sawyer, New York City architects, until his retirement in April, 1957, died February 4 in Danbury, Conn. He was assistant man-

Now is the time for soil-cement...

Soil-cement can end upkeep problems on this road in a hurry.

Attractive, smooth-riding soil-cement road in Kansas

Fastest-laid pavement there is...

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Roads are paved and back in service fast. Local traffic can use soil-cement the same day it's laid.

Paving with soil-cement is quick and easy. Well-organized crews, using modern equipment, have completed as much as two miles a day.

You use almost any kind of soil—plus portland cement. Even old road surfacing can be mixed right in. That's why first costs are so low—75% of all your materials are free. Add a bituminous topping. You've got a pavement good for 20 years and more . . . and maintenance costs *stay low*.

Soil-cement grows stronger year by year. Core tests prove it. And soil-cement has beam strength to spread the load over the subgrade. It's a hardened mass that won't rut, pothole or soften. That's why street and highway officials everywhere are looking into this low-cost, rigid-type pavement. Write for free booklet, "*Soil-cement Pavement.*" Distributed only in U.S. and Canada.

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A national organization to improve and extend the uses of portland cement and concrete

Saved...$48,348 a mile...

Heavy-duty ASPHALT pavement on Interstate highway saved North Dakota an estimated $600,000■■■■■■■

■■■■ For the 12.092 mile two-lane Valley City East section of U. S. Highway #10, the State of North Dakota chose modern Asphalt paving *(12" gravel base, 5" Asphalt pavement).*

This decision saved an estimated $48,348 *a mile* on initial costs alone, compared to bid costs on two lanes of nearby slab-paved section.

"We feel Asphalt paving is superior," said Mr. Ronald Megarry, Megarry Brothers Construction Co. "It not only costs less to lay than rigid type paving but also less to maintain."

Modern Asphalt construction has saved state after state up to 10% . . . and sometimes up to 50% . . . on paving costs alone.

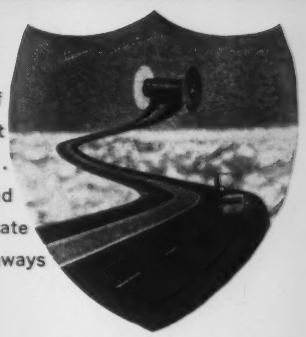
with rugged ASPHALT paving!

And, in one impartial report, 7 out of 10 states said that heavy-duty Asphalt paving costs less for maintenance. On the New Hampshire Turnpike, for example, maintenance costs have been only $36.07 a mile, per year.

In winter, snow melts faster, making Asphalt pavements safer. And Asphalt paving is not harmed by de-icing chemicals. Also, heavy-duty flexible Asphalt pavement stands up in temperature extremes.

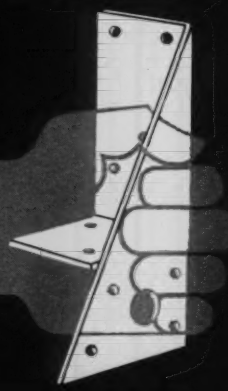
For maximum economy, comfort and road life . . . at minimum cost . . . make sure your new Interstate Highways are Asphalt-paved. *You* can bank on their permanence.

The ASPHALT Institute, *Asphalt Institute Building, College Park, Maryland*



Ribbons of velvet smoothness.. **ASPHALT**-paved Interstate Highways

For 'Shear' HOLDING POWER



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ENR-583

. . . Obituaries

ager of the Federal Housing Administration from 1935 to 1947.

Comfort Avery Adams, 89, died in Philadelphia Feb. 21. A past-president of the American Institute of Electrical Engineers, he had been Lawrence Professor Engineering at Harvard University from 1914 to 1936, serving as dean of the school of engineering in 1919.

Daniel J. Riordan, Jr., 59, a civil engineer and deputy director for the City Division of Real Estate in Buffalo, N. Y., died there February 5. He formerly was a civil engineer for the New York Central system.

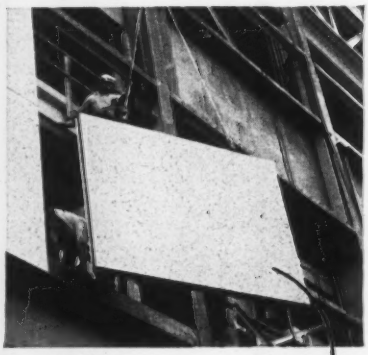
Frank P. Bentley, an assistant engineer with the N. Y. State Highway Department, died at Troy, N. Y., February 11.

John M. Baldwin, 82, civil engineer of Norfolk, Va., died recently. An 1898 graduate of Virginia Polytechnic Institute, he worked in the Engineering Department of U. S. Steel Corp. and as a division engineer with the Illinois Central Railroad before forming his own civil engineering firm in 1908.

William C. Chambers, 95, one of Canada's pioneer roadbuilders, died February 1 in Toronto. He had been a director of many construction companies in Ontario, and headed a firm that built much of the Northern Ontario Railroad. In addition, his firm built Toronto's first filtration plant.

Edward E. Ashley, Jr., 74, consulting engineer in New York City for nearly half a century, died February 3. He had gained a national reputation for his work in air conditioning, lighting and electric elevators. In the 20's he developed albeda glass to overcome the poor effects of department store lighting on the appearance of merchandise, by diffusing the light's harshness. Mr. Ashley maintained his own firm since 1932. Recently, the firm of Edward E. Ashley, consulting engineers, had supervised the lighting and air conditioning in the renovation of Metropolitan Museum of Art, New York City. It also directed the electrical engineering for the Socony-Mobil Building in midtown Manhattan. During World War I, Mr. Ashley served as a major in the construction division of the Army Signal Corps. He was one of the developers of the first military airfields. Prior to opening his own office, he had been a partner in the New York City architectural firm of Starrett & Van Vleck. He began his career in 1901 after completing engineering courses at Cooper Union and Cornell University.

Building going up ...costs coming down



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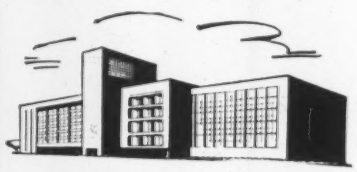
CONCRETE WALL PANELS

Here's a new, modern building material that's slashing construction time and labor costs on every job. Marietta concrete wall panels are pre-cast in basic sizes either solid or with a "superior" insulation core making them equal in "U" value to a 12" masonary wall. Cast-in metal inserts bolt directly to building framework and panels go smoothly together with tongue and groove fit for quick, easy erection in any weather. pleasing architectural effects result from the broomed or colorful exposed aggregate exterior finishes.

Get the complete story on the many cost-saving advantages of Marietta wall panels . . . save as much as 30% in construction costs on your next building project. Marietta's engineering staff will assist you in your plans. Write for details and literature today.



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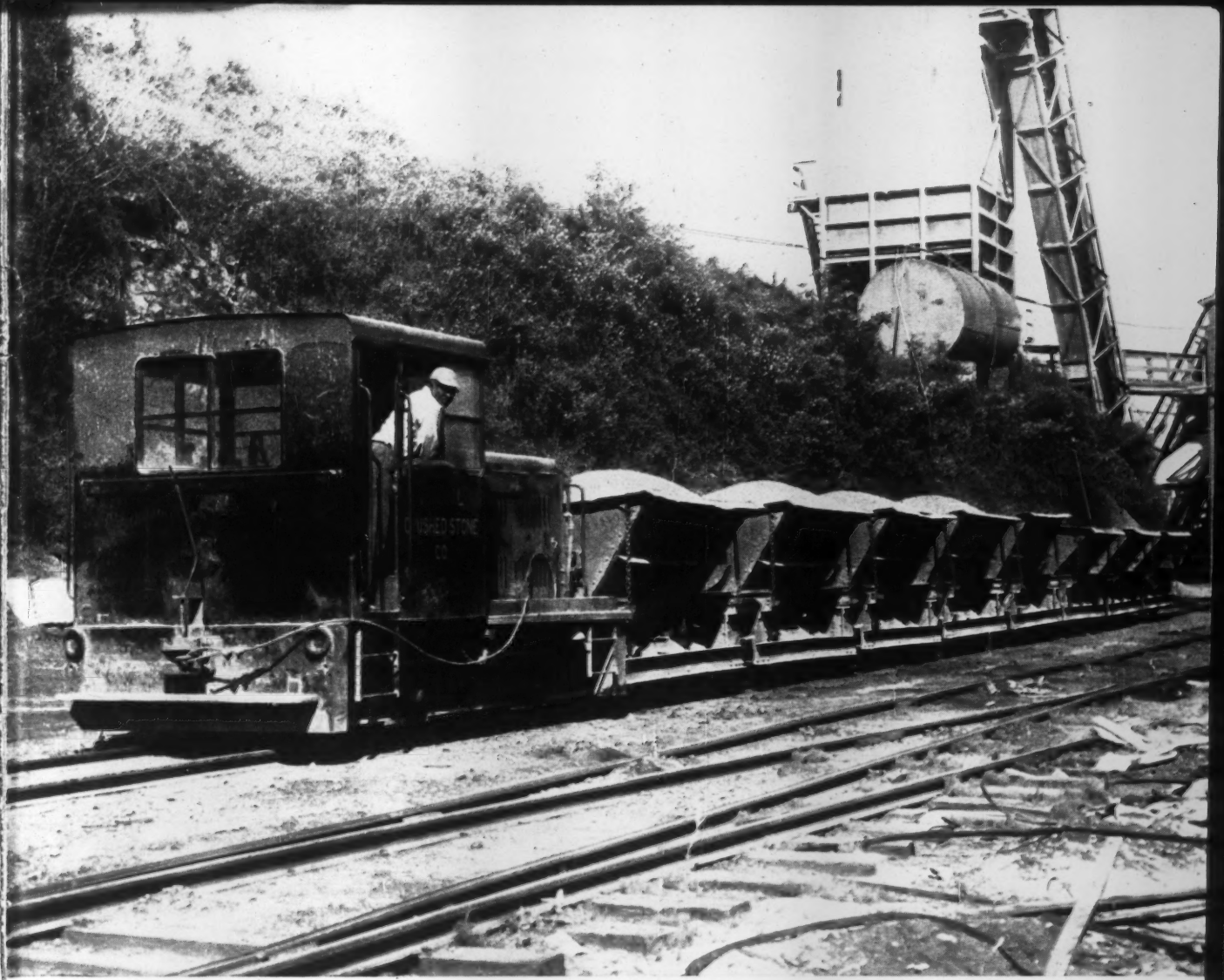
BRANCH OFFICES: Baltimore 21, Md., Charlotte 6, N.C., Nashville, Tenn., Jamestown, N.Y.



20-Ton Plymouth Torqomotive hauls stone over 2000 feet of track nine hours daily at General Crushed Stone Co.

All-Weather Haulage Shows Extra Profits with a Plymouth on the Job!

It is a fact that's proved day after day on all kinds of switching, spotting and hauling jobs—it takes a reliable locomotive like Plymouth to meet today's demands.

They'll show you their great pulling power and stability to best advantage when you give them big jobs to do—run them on steep grades—operate them around the clock.

Your operators will welcome the effortless performance of a Plymouth. You will get more tons hauled with less gasoline, oil or power consumed. We can show you proof of that, whether you choose mechanical or Torqomotive Drive—the Plymouth-designed transmission coupled to hydraulic torque-converter. To find out how well a Plymouth locomotive meets your everyday haulage needs, send us a brief outline of your operation. Address: Plymouth Locomotive Works, The Fate-Root-Heath Company, Dept. A-4, Plymouth, Ohio.

Read how this user applauds Plymouth...

"We're very well satisfied with the performance of our Plymouth Torqomotive . . . since replacing our steam locomotive a year ago. We're saving time daily—and down-time for repairs has not exceeded 10 hours the entire year!"

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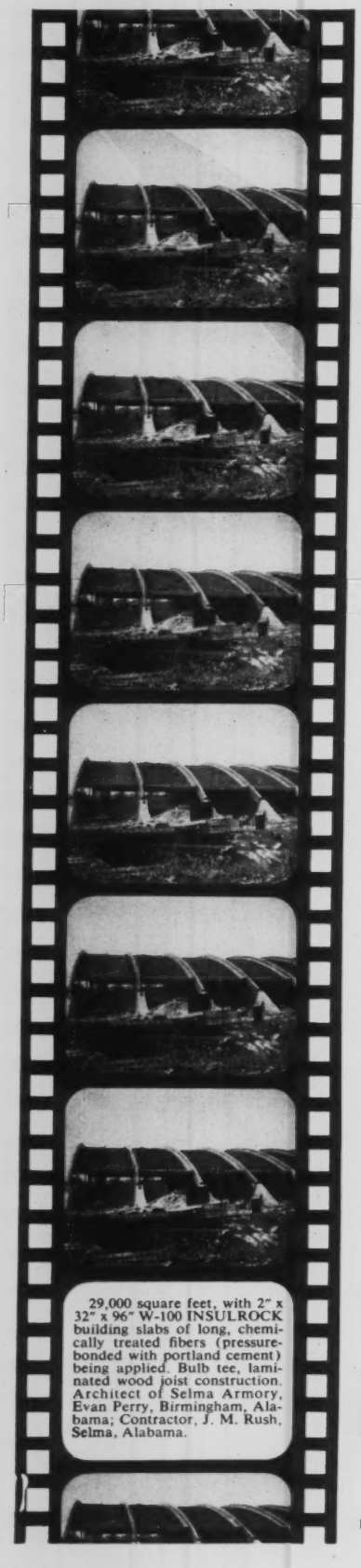

29,000 square feet, with 2" x 32" x 96" W-100 INSULROCK building slabs of long, chemically treated fibers (pressure-bonded with portland cement) being applied. Bulb tee, laminated wood joist construction. Architect of Selma Armory, Evan Perry, Birmingham, Alabama; Contractor, J. M. Rush, Selma, Alabama.

Preferred performer everywhere – the strong, silent type

INSULROCK®

School gyms. Convention halls. Factory workrooms. Restaurants. Business buildings. Armories, too, as pictured here.

Strong . . . The roof decking is INSULROCK, strong, tough, bound-to-last Insulrock slabs . . . resistant to weather wear and tear, insect damage, fungi growth . . . non-combustible, meeting National Board of Fire Underwriters requirements, listed by UL. Insulrock insulates. It goes on wood or steel framing fast, economically, any time, anywhere.

Silent . . . The ceiling is INSULROCK, the underside of the same Insulrock roof decking slabs. Insulrock makes a practical, profitable acoustical ceiling honeycombed with thousands of sound-silencing air pockets that trap, still, and kill up to 85% of ordinary ceiling-reflected noises. Insulrock ceilings help to simplify air-conditioning, too.

So you get strength. You get quiet.

And you get good looks . . . Permanent good looks, with Insulrock . . . random-textured, off-white, good looks, easy to clean, to paint, to keep painted, any modern color, to match or contrast with any surroundings.

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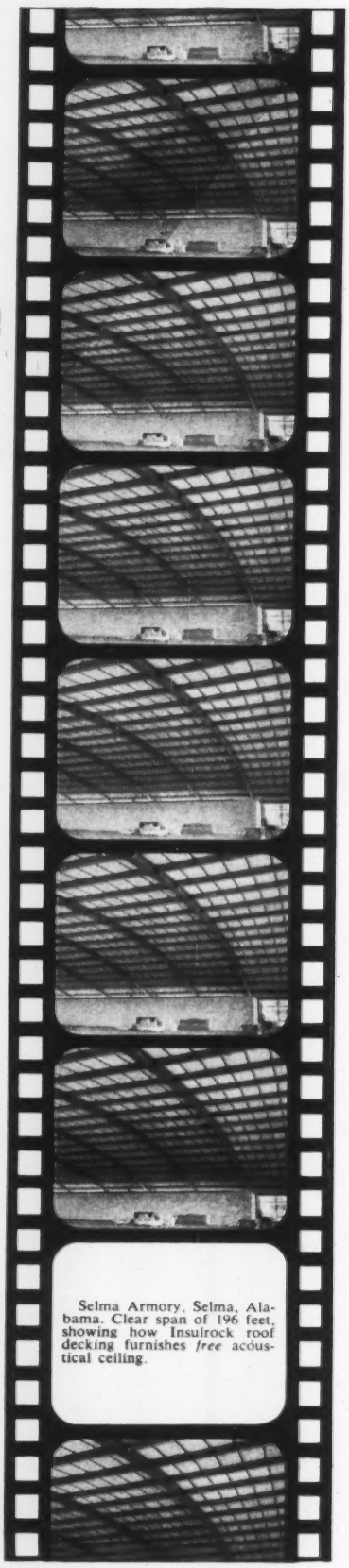

Selma Armory, Selma, Alabama. Clear span of 196 feet, showing how Insulrock roof decking furnishes *free* acoustical ceiling.

Bids Asked—Low Bidders—Contracts Awarded—

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NEW ENGLAND

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
March 26 Vermont
STREETS AND ROADS
March 28 Vermont

▲† **Me., Limestone** — UTILITIES—BA On Or About 4/29—U. S. Eng., 150 Causeway St., Boston, Mass., constr. surface water supply, Loring Air Force Base on Little Madawaska River, ENG-19-016-58-101. Extended date. $1,500,000-$2,000,000. Plans deposit $25. Metcalf & Eddy, Statler Bldg., Boston, Mass., engrs. CD 3/4.

BUILDINGS—BA

▲ **Conn., Danbury**—HOSPITAL—BA 3/27—Danbury Hospital, Locust Ave., second unit, hospital addn., $1,750,000. Extended date. Rogers & Butler, 219 E. 44th St., New York, N. Y., archts. Meyer, Strong & Jones, 101 Park Ave., New York, N. Y., engrs. CD 2/18.

▲ **Conn., Putnam**—HOUSING—BA 3/27—Putnam Housing Auth., City Hall, Proj. Conn-24-1, Hampshire Heights Housing Project, 124 units, 29 bldgs., $1,-741,000. Plans deposit $75. Arthur E. Thomas, 28 Shetucket St., Norwich, archts. Fred S. Dubin Assocs., 178 S. Whitney St., Hartford, engrs. CD 10/3.

▲ **Me., Bangor**—HOUSING—BA On Or About 4/10—Procurement Office, Dow Air Force Base, housing Inv. 17-601-58-46, Dow Air Force Base. $11,000,000. Alonzo J. Harriman, Inc., 292 Court St., Auburn, archt. Sherwood G. Tribou, Wayne, electrical engr. CD 1/23.

BUILDINGS—SLC

▲ **Conn., Windsor**—PROCESSING SYSTEM, BLDGS.—Combustion Eng. Inc., Reactor Dev. Div., Central Ave., soon lets contract Phase 2, 2 bldgs. and processing system, plant, $1,000,000. Hayden, Harding, & Buchanan, 1340 Soldiers Field Rd., Brighton, Mass. archts. CD 2/25/58.

▲ **Mass., Pittsfield**—OFFICE—Berkshire Life Ins. Co., 7 North St., Pittsfield soon lets contract, insurance office, South St. $2,000,000. Hoyle, Doran & Berry, 248 Boylston St., Boston, archts. CD 12/11/56.

HEAVY CONSTRUCTION—LB & CA

▲ **MASSACHUSETTS**—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,
Lane Constr. Corp., P. O. Drawer 911, Meriden, Conn. CA $3,197,625, est. $4,095,730, hy. relocation Rte. 5, FA Proj.-1-IN-351 (2) Contr. "A", Longmeadow. Whitman & Howard, Inc., 89 Broad St., Boston, engr. Bids Feb. 11. CD 2/14, under LB.

BUILDINGS—LB & CA

▲ **Beacon Constr. Co.**, 102 Hano St., Allston, Mass. CA $1,448,500, HOUSING Proj. NH 4-1, Gosling Rd. and Wood Ave., PORTSMOUTH, N. H. Portsmouth Housing Auth., 25 Vaughan St., Portsmouth, N. H. Bids Feb. 27. CD 3/4, under LB.

▲ **Commonwealth of Mass.**, University of Mass., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass., rejected bids Feb. 14, U-57-1, Science Center (second section), University of Mass., AMHERST, MASS. LB $1,873,000. Will re-advertise. CD 2/19, under LB.

▲† **Green Manor Constr. Co.**, Middle Turnpike, East Manchester, Conn., CA $6,196,376, est. $6,000,000, Family Type HOUSING, Bedford and Neilson Rds., Laurence G. Hanscom Field, IFB-19-0604-58-62, BEDFORD, MASS. Contracting Officer, Air Force Cambridge Research Center, Laurence G. Hanscom Field, Bedford, Mass. Bids Feb. 18. CD 2/24,. under LB.

▲ **Louis Marion & Son**, 100 Textile Ave., Lowell, Mass., LB $1,236,000, E-812, Contr. 10, ELECTRONICS-PLASTICS-ENGINEERING BLDG., Lowell Technological Institute, LOWELL, MASS. Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Mar. 7. CD 2/19.

▲ **Daniel O'Connell's Sons, Inc.**, 480 Hampden St., Holyoke, Mass. CA $4,950,160 Proj. 56-886, Cathedral HIGH SCHOOL between Westover Rd. and Roosevelt Ave., SPRINGFIELD, MASS. R. C. Diocese of Springfield, Most Rev. Christopher J. Weldon, Bishop, Chancery Office, 68 Elliot St., Springfield, Mass. Bids Mar. 4. CD 3/10, under LB.

▲ **Vara Constr. Inc.**, 718 Huntington Ave., Boston, Mass. LB $4,219,000, HOSPITAL addns., alterations, 71 Jaques Ave., WORCESTER, MASS. City, City Hospital, 71 Jaques Ave., Worcester, Mass. Bids advanced to Mar. 6. CD 2/25.

▲ **A. F. Peaslee, Inc.**, 37 Lewis St., Hartford, Conn., CA $1,239,397, Irving A. Robbins JUNIOR HIGH SCHOOL, FARMINGTON, CONN. Town of Farmington, Town Hall, Unionville; Conn. Bids Feb. 19. CD 2/25, under LB.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

▲ **N. Y., Mineola**—BA 3/25—Bd. Supervs. Nassau Co., Old County Court House, sanitary sewers in Lynbrook, East Rockaway and Hewlett. $5,000,000. CD 1/9.

▲† **N. Y., Westhampton Beach**—HOUSING—BA On Or About 4/15—U. S. Eng., 111 E. 16 St., New York, Zone 3, armed services housing consisting 220 family housing units, Suffolk County Air Force Base, Inv. No. 30-618-58-43. CD 8/22/56.

BUILDINGS—BA

▲ **N. Y., Greenburgh**—SCHOOL—BA 4/3—Union Free School Dist. 8, Town of Greenburgh, 33 West Hillside Ave., White Plains, elementary school on Warburg Campus. Extended date. $1,000,000. Sherwood, Mills & Smith, 65 Broad St., Stamford, Conn., archts. CD 2/19.

▲ **N. J., Berkeley Heights**—SCHOOL—BA 4/8—Union Regional School Dist., Felmer Ave., Springfield, Regional High School, $2,500,000, Extended date, Frederick Elsasser, 2013 Morris Ave., Union, archt. CD 12/4.

BUILDINGS—SLC

▲ **D. C., Wash.**—SCHOOL—St. John's College High School, 1225 Vermont Ave. N.W., soon lets contract, school, Military Rd., Oregon Ave. and 27th St. N.W. $2,500,000. Walton & Maddon, 3510 Rhode Island Ave., Mt. Ranier, Md., archts. CD 4/29/54.

HEAVY CONSTRUCTION—LB & CA

▲ **Bonwit Constr. Co.**, 370 Lexington Ave., New York 17, N. Y., LB $1,261,855 (9 bidders), Contr. BP-150.007, constr. pier shed exclusive of structural steel for new Pier 1 at Brooklyn-Port Authority Piers, BROOKLYN, N. Y. Port of New York Auth., 111 Eighth Ave., New York 11, N. Y. Bids Mar. 11. CD 1/31.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $44,000; other public works $73,000; industrial buildings $93,000; other buildings $344,000. Also Foreign projects of $100,000 and more in size of interest to American contractors.

By Regions & Classes of Construction
(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED

New England — **Middle West**
Middle Atlantic — **West of Mississippi**
South — **Far West**

PROPOSED WORK
Water Supply — **Public Buildings**
Sewers, Waste Disposal — **Mass Housing**
Bridges — **Commercial Buildings**
Streets & Roads — **Industrial Buildings**
Earthwork, Waterways — **Unclassified**

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.
BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.
SOON LETS CONTRACT: SLC
LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.
CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
ENR Engineering News-Record
CD Construction Daily

For additional reports see Construction Daily.

▲ **The Forest Co.**, 121 N. Main St., Wharton, N. J. CA $2,644,708 No. 1, sewage pumping stations, force mains and collection works, HARRISBURG, PA. Harrisburg Sewage Auth., Municipal Bldg., Harrisburg, Pa. Grand total $5,990,196. Bids Jan. 30. CD 2/4, under LB.
Rice & Weidman, P. O. Box 1386, Lancaster, Pa. CA $2,522,804 No. 2, sewage plant and outfall sewer (Harrisburg, Pa.);
E. C. Ernst, Inc., 4200 Chamber Hill Rd., Harrisburg, Pa. CA $107,884; No. 1-C electrical for No. 1 (Harrisburg, Pa.).
Harry Ressler, Mountville, Pa. CA $714,800 plumbing for No. 2 (Harrisburg, Pa.).

▲ **PENNSYLVANIA** — Pa. Hys. Dpt., 506 North Office Bldg., Harrisburg,
Buckley & Co., 1317-21 S. Juniper St., Phila. 47, Pa., CA $4,853,299, constr. 4,543 ft. divided hy., c. conc. variable in width, 5 bridges Roosevelt Blvd. 9th to 18th Sts., Phila., Phila. Co. Bids Jan. 24, awarded Mar. 7. CD 1/29, under LB.

▲ **MARYLAND**—State Rds. Comm., 108 E. Lexington St., Baltimore, Zone 2, Bids opened 3/4,
Md.—**Chas. W. Williams & Assoc. and Forty-first Street Corp.**, 2210 Maryland Ave., Baltimore 18, Md., LB $2,390,343 (12 bidders) grading, drainage, surf. 4.392 mi. Baltimore-Harrisburg Expressway near Parkton, 3.204 mi. connecting roads, one-45 ft. span I-beam bridge at Downer Rd. B-578-35-420 & B-478-42-420, Baltimore Co. (Correction—contractor and location of project). CD 3/6, under LB.
Md.—**Taylor & Keebler**, Clinton, Md., LB $1,187,207 (5 bidders), grading, drainage, surf. new northbound lane US 301, 6.142 mi. also rehabilitation of existing S 301 along same route, distance 12.368 mi., P-713 4-320, Prince George Co. (Correction—contractor and location of project). CD 3/6, under LB.

▲ **PENNSYLVANIA**—Pa. Hy. & Bridge Auth., 506 North Office Bldg., Harrisburg,
James Julian, Inc., 405 S. DuPont Rd., Elsmere, 5 Del. CA $1,304,714, widen 24,766 ft. existing road with plain c. conc. or cr. aggreg. base variable in width and surf. T. R. US 202 W. Goshen Wettown, Thornbury, Concord and Birmingham Twps. Bids Jan. 24, awarded Mar. 10. CD 1/30, under LB.
C. H. Schwertner & Son, Inc., 1220 Hamilton St., Phila. Pa. CA $140,000 swimming pool and bathhouse filter sys., parking area, LANSDOWNE, PA. Lansdowne Swim Club, 5 Mansfield Rd., Lansdowne, Pa. CD 11/20.

▲ **MARYLAND**—State Rds. Comm., 108 E. Lexington St., Baltimore, Zone 2, Bids opened Mar. 11,
Md.—**A. H. Smith**, Branchville, Md., LB $2,608,729 (3 bidders), grading, drainage, surf. 10.802 mi. dual hy. US 301 incl. 1-45x49x204 ft. span bridge, 1 dual 39x140 ft. 3 span bridge near Upper Marlboro, P 713-2-320 & P 732-3-329, Prince George Co.;
Md.—**George D. Fox & Co. Inc.**, 5717 Harford Rd., Baltimore, Md., LB $902,126 (5 bidders), grading, drainage, wid'n., relocating and resurf. 4.057 mi. State Rte. 152 from Stockton north, H. 360-3-420, Harford Co. CD 3/6.

▲ **Square Constr. Co.**, 115 South Haven St., Baltimore, Md., CA $1,486,172, constr. 12 ft. diam. storm water sewer, East Capitol St. between Burns and Texas Ave., WASH., D. C. D. C. Govt., Sanitation Dpt., 499 Pennsylvania Ave., Wash., D. C. Bids Feb. 28. Awarded Mar. 6. CD 3/5, under LB.

BUILDINGS—LB & CA

▲ **Foster-Newman Co. Inc.**, 3622 13 Ave., Brooklyn 18, N. Y., LB $1,332,400, (13 bidders), general contract LIBRARY BLDG. (Bldg. 4) at State University of New York, Harpur College, ENDICOTT, N. Y. State Dpt. P. Wks., Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany, N. Y. Bids Mar. 6. CD 3/26.
Louis N. Picciano & Son, Endicott, N. Y., LB $348,-000, (11 bidders), heating (Endicott, N. Y.).

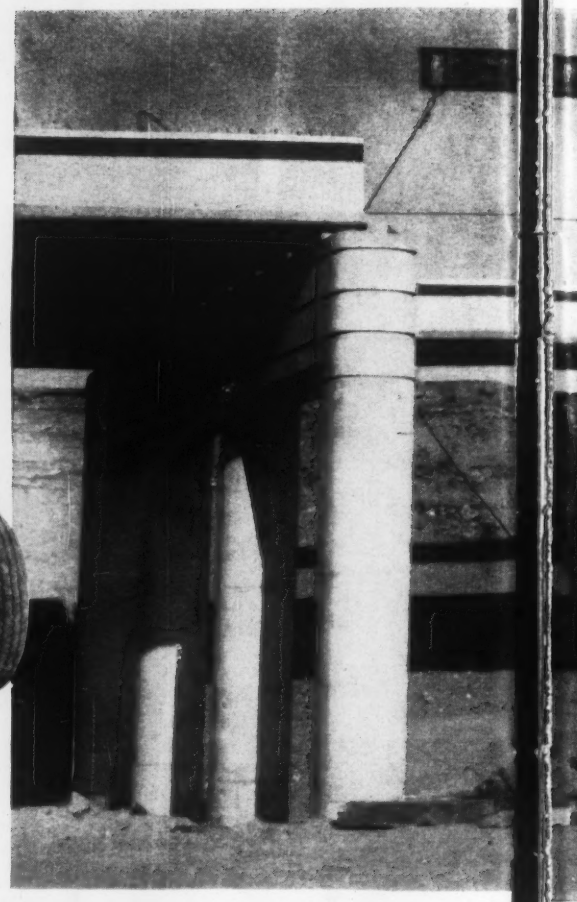
▲ **Depot Constr. Corp.**, 42-15 Crescent St., Long Island City, N. Y., CA $6,359,000, general contract CONTINUED TREATMENT and DISTURBED PATIENTS BLDG. (Bldg. 105) Manhattan State Hospital, Wards Island, NEW YORK, N. Y. Dpt. P. Wks., Gov. Alfred E. Smith Office Bldg., Albany, N. Y. Bids Feb. 20. Grand total $7,598,457. CD 2/26, under LB;
Cartmel-Morris, Inc., 36052 37 St., Long Island City, N. Y., CA $546,480, plumbing Bldg. 105, (New York, N. Y.);
Forest Elec. Corp., 630 Ninth Ave., New York 19, N. Y., CA $692,977, electric, Bldg. 105 (New York, N. Y.).

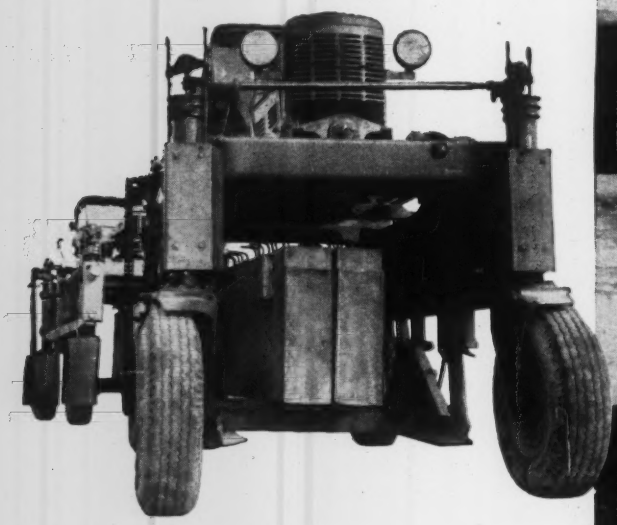
▲ **Peter Feinberg**, c/o H. I. Feldman, archt., 415 Lexington Ave., New York 17, N. Y. Owner Builds. $1,250,000, 17 story APARTMENT, Horatio St., southeast corner 8 Ave. at 14 Horatio St., NEW YORK, N. Y. CD 10/3/56.

▲ **Furlang Constr. Corp.**, 810 Pelham Parkway South, New York, N. Y., Owner Builds, $1,200,000, 6 story APARTMENT, Lydig Ave. between Muliner and Bogart Aves., NEW YORK, N. Y. CD 1/30.

Continued on page 158

PLACING MAIN SPAN GIRDERS—A crane with a spreader beam is erecting a main span girder prestressed with USS American Super-Tens Stress-Relieved Strand. Note the ease of erection.





NEW WAY TO MOVE GIRDERS—Here a straddle truck is transporting a girder from the prestressing plant to the job. This was a time- and money-saving way to transport prestressed girders. Construction was speeded up because the girders were precast, then transported to the job site for immediate erection.

On the Garden State Parkway . . . 405 prestressed

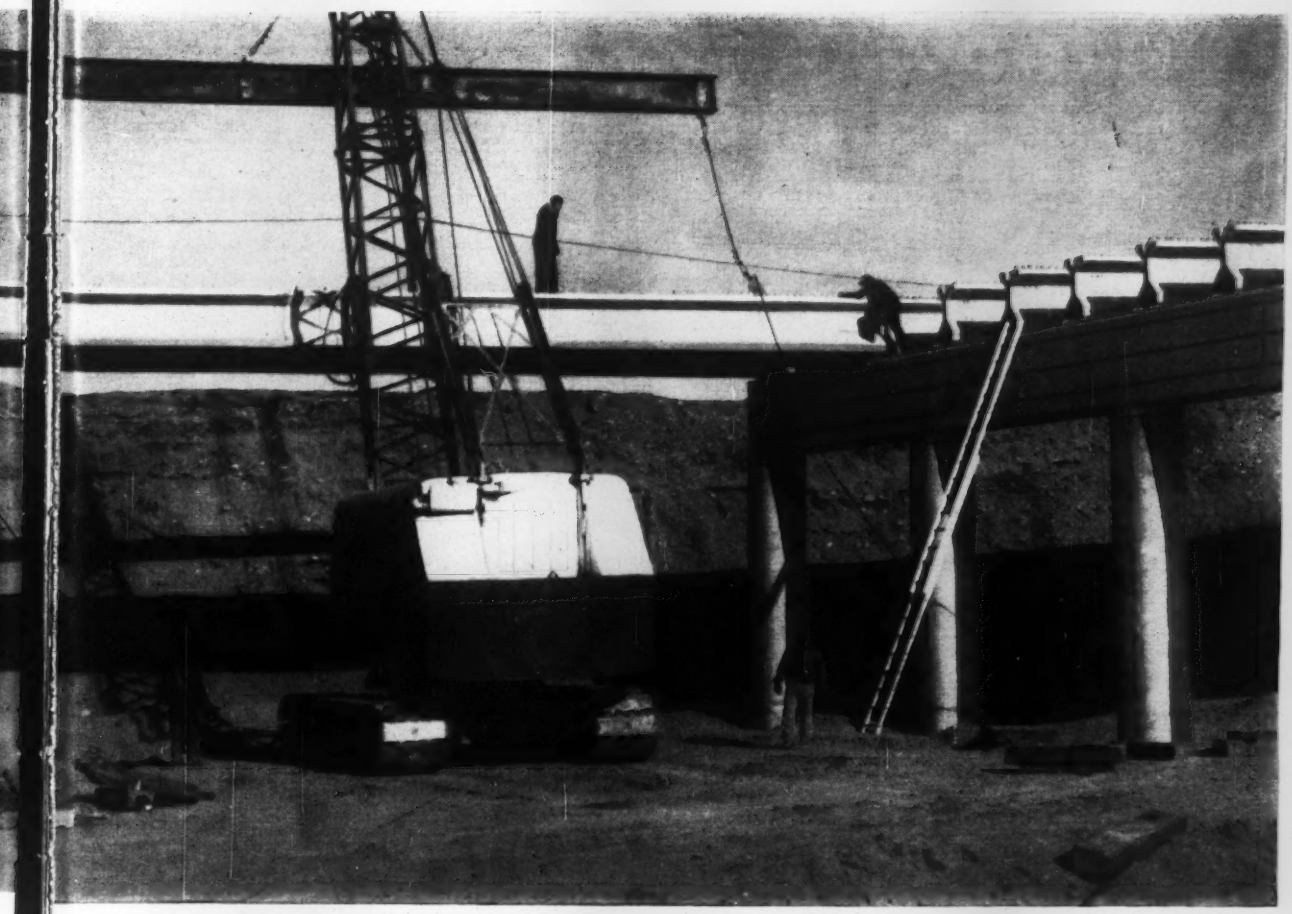
HERE IS the new USS American Super-Tens Stress-Relieved Strand reel furnished in standard sizes of 50" and 44". The new 2-ply construction resists warping and splitting, resulting in longer service life.

Linking New Jersey with New York and New England, the recently completed section of the Garden State Parkway is 9¼ miles of ultramodern highway. Along this new super-road there are eighteen prestressed concrete bridges. USS American Super-Tens Stress-Relieved Strand was used on this modern superhighway development.

The manufacturer of the prestressed beams

USS American

These people built this section of the Garden State Parkway: Design Engineers: Fay, Spofford & Thorndike, Inc., Boston, Mass. • Contractor & Manufacturer of Prestressed Beams: Reid Contracting Company Inc., Woodbridge, New Jersey; L. W. Lancaster, Chief Engineer • Consulting Engineer for Contractor: Charles C. Zollman & Associates, Newtown Square, Pennsylvania.



beams were produced in 81 days

for these bridges produced more than 400 prestressed beams in eighty-one days.

Prestressed concrete is a proven construction material with unlimited possibilities in building roofs, floors, walls, beams, slabs, columns, and foundations, as well as for bridges. American Steel & Wire pioneered in this development in 1951 by being the *first* to develop a new product—special high tensile strength strand for the first pretensioned bridge in this country. Our engineers have much experience in this field, and they will be happy to discuss the application of prestressed concrete to your construction needs.

For more complete details, call our nearest Sales Office today. Or write to American Steel & Wire, Rockefeller Building, Cleveland 13, Ohio.

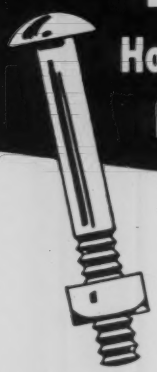
Super-Tens Stress-Relieved Wire & Strand

American Steel & Wire
Division of USS United States Steel

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad

HARDWARE

Hot Dip Galvanized or Black For HEAVY Construction



Made to your specifications of:
Steel or Genuine Wrought Iron.

SHIPPED *TODAY* IF NECESSARY

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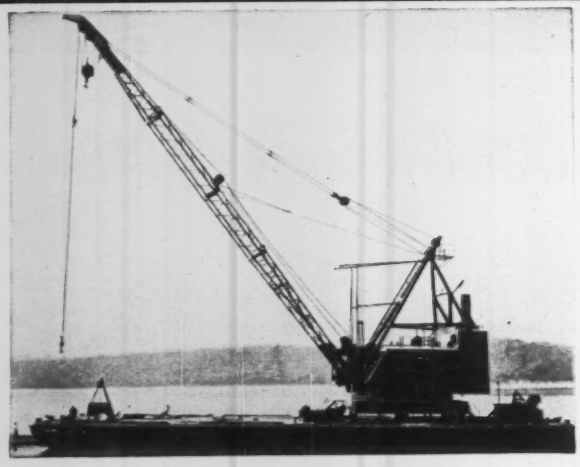


FLOATING WHIRLEY

DERRICKS

FOR CHARTER

Steam, full revolving. Capacities at 45 ft. radius: (1) 50 ton, Wiley model 124, 115 ft. boom, new 1957 (1) 40 ton Wiley model 120, 107 ft. boom.

HUGHES BROS., Inc.

17 Battery Pl., N. Y. WH 4-1048

(Continued from page 155)

▲ **Robert Glenn, Inc.**, 101 Park Ave., New York 17, N. Y., CA Est. **$1,800,000.** 5 story LIBRARY and CLASSROOM BLDG. Claremont Ave., 117 and 118 Sts., NEW YORK, N. Y. Barnard College, Broadway and 119 St., New York, N. Y. CD 11/14/56.

▲ **Skyview Terrace Homes**, c/o Butterly & Green, Inc., 168-25 Hillside Ave., Jamaica, N. Y., Owner Builds, **$1,200,000**, 80 HOUSES, Weeks Rd. east Deer Park Ave., NORTH BABYLON, N. Y.

▲ **Gushin & Gordon**, 210 Haverford Ave., New Brunswick, N. J. Owner Builds. **$1,000,000**, 60 HOUSES, Stony Rd. off Rte. 1 to be known as Woodward Estates, EDISON, N. J. Erwin Gerber, 11 Commerce St., Newark, N. J., archt.

▲ **Tibbetts Contg. Corp.**, 1 Lawton St., Yonkers, N. Y. Own Forces. **$4,000,000**, design and constr. 1,000,000 sq. ft., brick, block PLANT BLDGS., mostly 1 story bldgs., on Brewster Quarry site, Tonnelle Ave., NORTH BERGEN, N. J.

▲ **Walter C. Hurley**, 1928 Heck Ave., Neptune, N. J., CA **$1,337,595**, general contract 58 room HIGH SCHOOL, NEPTUNE, N. J. Bd. Educ., Twp. of Neptune, Neptune, N. J. Awarded Feb. 26. CD 2/26, under LB.

▲ **E. Powers Constr. Co.**, 605 Briarcliff St., Maywood, N. J., and **Thomas Constr. Co.**, 165 Hillside Ave., Paterson, N. J., LB total cost **$2,240,770**, est. $2,100,000, general contract Paradise Knolls and Hillcrest Schools addns., WEST MILFORD, N. J., Bd. Educ., West Milford, N. J. Bids Feb. 28. CD 1/14.

▲ **Kaul & Assocs.**, McLean, Va., CA **$2,245,000**. Capehart HOUSING at Olmstead Air Force Base, MIDDLETOWN, PA. Procurement Officer, Olmstead Air Force Base, Middletown, Pa. Awarded Feb. 12. CD 1/31/56.

▲ **M & L Constr. Co., Inc.**, 108 S. 40th St., Phila. Pa. CA **$1,250,000** Bishop McDevitt HIGH SCHOOL and parking area WYNCOTE, PA. Roman Catholic Archdiocese of Phila. 310 N. 19th St., Phila. Pa. Bids Feb. 14. CD 2/14.

▲ **Kirby & McGuire Inc.**, 2518 Greenmount Ave., Baltimore 18, Md., CA **$1,914,500** (with alterinates) 4 brick, steel, concrete block POLICE STATIONS, Northeastern, Southeastern, Northwestern and Western, BALTIMORE, MD. City, Bureau of Bldg. Constr., 410 Municipal Bldg., Baltimore 2, Md. Bids Feb. 26. CD 2/28, under LB.

▲ **L. G. Meltzer Assocs.**, 1012 14 St. N.W., Wash., D. C., Owner Builds, **$1,500,000**, 176 unit APARTMENT, 8 and Gorman Ave., LAUREL, MD. Jack Cohen, 7961 Eastern Ave., Silver Spring, Md., archt.

▲ **State of Marylarid, Dpt. P. Imprvts.**, 506 Park Ave., Baltimore, Zone 1, Md., rejected bids Feb. 25, DINING HALL and LABORATORY, State Teachers College, FROSTBURG, MD. LB **$1,139,400**. Will re-advertise. CD 3/3, under LB.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

March 25 North Carolina
March 26 Louisiana
March 27 Florida
March 28 Tennessee

STREETS AND ROADS

March 25 North Carolina
March 26 Louisiana
March 27 Florida
March 28 Tennessee

▲† **Alabama**—BA 4/3—U. S. Eng., 2301 Grant St., Mobile, constr. Jackson Lock and Dam with control station, water stage recorder houses, roads and storm drainage; the structure will incl. from right to left bank; a navigation lock, with clear inside dimensions of 110x600 ft. and a maximum lift of 35 ft., a gated spillway 552 ft. long controlled by 8 individually-operated tainter gates, a fixed crest spillway 639 ft. long across present river-channel and an earth dike about 1,000 ft. long connecting the spillway to high ground on left bank, a 3 story concrete lock control station will be built on the lock wall adjacent to gated spillway, located on Tombigbee River near Coffeeville. $23,600,000.

BUILDINGS—BA

▲ **La., Lake Charles**—HOSPITAL—BA 4/8—State Bldg. Auth., State Capitol, Baton Rouge, charity hospital $7,000,000. Plans deposit $50. Dunn & Quinn, 1735 Ryan St., engrs. CD 1/23.

▲ **Va., Arlington**—DEPARTMENT STORE—Bids Asked—Lansburgh's Department Store, 7th, 8th and E Sts., NW, Wash., D. C., 150,000 sq. ft. department store incl. parking area, etc. Thalheimer & Weitz, 1315 Walnut St., Phila., Pa., archts. CD 9/10.

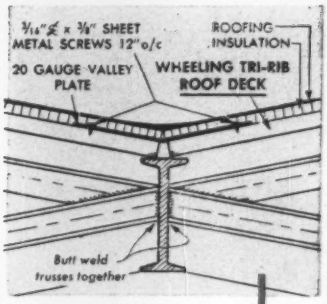
HEAVY CONSTRUCTION—LB & CA

▲ **Fred Howland, Inc.**, 1451 N.W. 20th St., Miami, Fla., CA **$1,137,713** (a) terminal bldg. addn. (b) Pier "E", Section 1-B, Miami International Airport, MIAMI, FLA. Dade Co. Port Auth., Court House, Miami, Fla. Bids Feb. 26. CD 3/4/58, under LB.

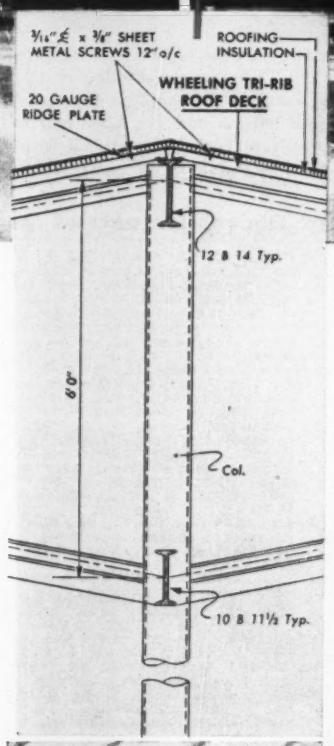
▲ **ALABAMA**—State Hy. Dpt., Montgomery, **MacDougald Constr. Co.**, 1625 Northside Dr., Atlanta, Ga. CA **$2,186,613**. grading, draining, paving 8 mi. from 1.1 mi. NE of Clanton, NW on Rte. 65, Chilton Co. Bids Dec. 20, awarded Jan. 8. CD 1/2, under LB.

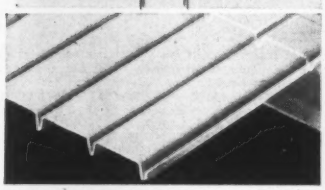
▲† **Jahncke Service, Inc.**, 814 Howard Ave., New Orleans, La. LB **$1,777,189**. dredging 36x500 ft. channel for Mississippi River-Gulf Outlet from Sta. 0:00 to Sta.

(Continued on page 160)


3/16"℄ x 3/8" SHEET METAL SCREWS 12" o/c
ROOFING INSULATION
20 GAUGE VALLEY PLATE
WHEELING TRI-RIB ROOF DECK
Butt weld trusses together

Unique Building Supply Center features roof of quickly installed Tri-Rib Roof Deck





Wheeling Tri-Rib Roof Deck is designed in accordance with specifications adopted by A.I.S.I. Light Gauge Cold-Formed Steel Design Manual, 1956 Edition.

Hechinger customers can forget about the weather! Roof, made of Tri-Rib Roof Deck, extends out 15 feet over walks on all sides to serve as an all-weather canopy.

Featuring a roof using a series of rhomboid-shaped umbrella trusses joined together and constructed of Wheeling Tri-Rib Roof Deck, the Hechinger Company's Rockville, Md., store is one of the world's most modern building supply centers.

Ideal for many types of construction, Tri-Rib is made of Wheeling Cop-R-Loy® steel – the famous copper-bearing steel that has proved its long-lasting qualities through years of actual field use! And – because Tri-Rib is light and strong – it requires fewer and lighter columns, shallower footings and eliminates the subpurlins required by many other types of roof construction.

On the installation shown above, Mr. Frank Wolfsheimer, president of Hechinger Engineering Corp., builders of the center, reports, "We were very pleased with the way Tri-Rib went on, especially with the speed of installation and the way Tri-Rib and Tri-Rib Accessories are engineered to work so perfectly together."

Find out how Wheeling Tri-Rib Roof Deck can help you, too. See Sweets, or contact our nearest representative. Wheeling Corrugating Company, Wheeling, West Virginia.

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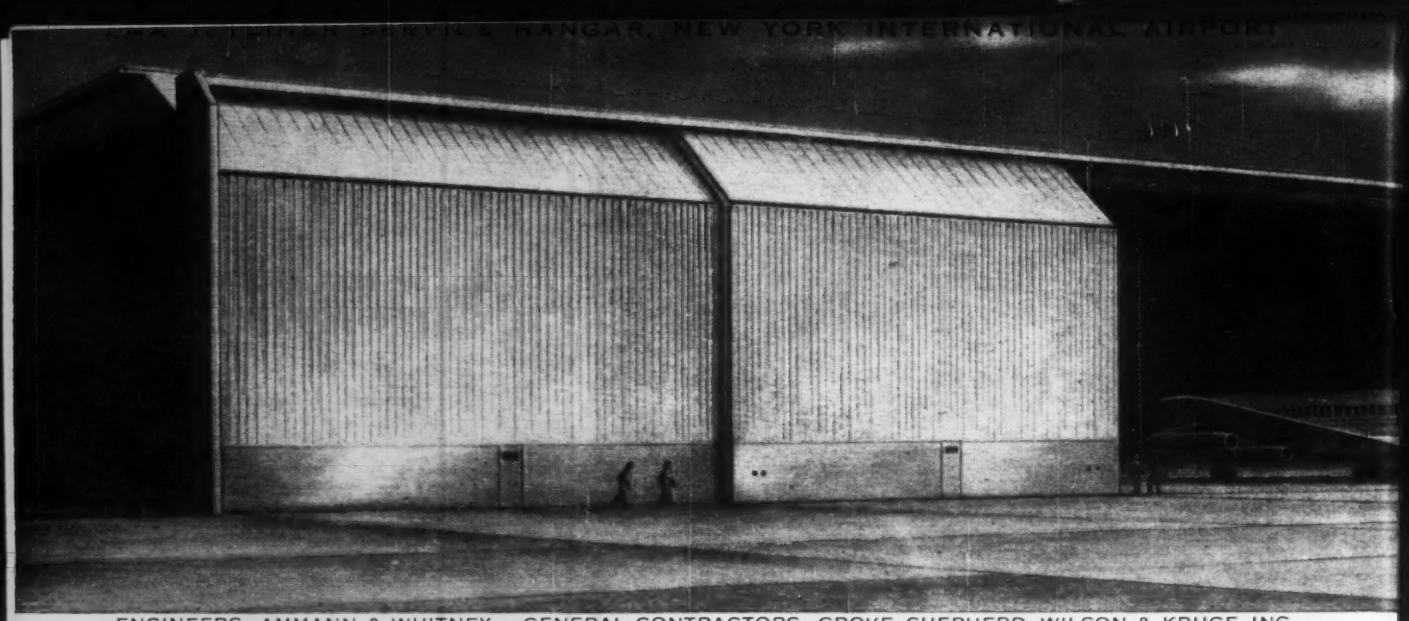


ENGINEERS: AMMANN & WHITNEY • GENERAL CONTRACTORS: GROVE, SHEPHERD, WILSON & KRUGE, INC.

PEELLE HANGAR DOORS

The TWA service hangar access door illustrated is 820 feet long and 50 feet high at the front. The Peelle horizontal sliding doors in this hangar are arranged in four banks of three door panels. These panels move in groups of three; with individual operators in each panel. Doors and canopies have corrugated aluminum skins. The canopies are part of the door structures.

Doors for two identical hangar openings were supplied for the TWA hangar. Peelle also manufactured and installed the doors for the Pan American Jetliner hangar and the Lockheed hangar, both at the New York International Airport, as well as the Motorstair in the terminal building.

PEELLE FOR DOORS • Freight Elevator Doors • Dumbwaiter Doors • Industrial Doors

(Continued from page 158)

130:00. Inv. 58-180, Orleans Parish, LOUISIANA. U. S. Eng., foot of Prytania St., New Orleans, La. Bids Mar. 5. CD 2/14.

BUILDINGS—LB & CA

▲ **J. W. Bateson,** Gibraltar Life Bldg., Dallas, Tex., LB **$2,635,725** (10 bidders), FEDERAL OFFICE bldg. (lease-purchase project), HUNTINGTON, W. VA. General Services Admin., 19th and F Sts. N.W., Wash., D. C. Bids Mar. 7. CD 2/6, under Public Buildings.

▲ **Henry C. Beck Co. & Utah Constr. Co.,** Fulton National Bank, Atlanta, Ga., CA **$8,790,000** (joint venture), COMMUNICABLE DISEASE CENTER, for Public Health Service (lease-purchase proj.) ATLANTA, GA. General Services Admin., P. Bldg., Wash., D. C. Bids Feb. 25, awarded Mar. 7. CD 2/27, under LB.

S. J. Curry & Co., Oglethorpe St., Albany, Ga., LB **$946,440,** (17 bidders) POST OFFICE and COURT HOUSE, (lease-purchase proj.) BRUNSWICK, GA. General Services Admin. Public Bldgs. Service, Region 450 Seventh St., Atlanta, Ga. Bids Mar. 11, CD 2/20, under Public Bldgs.

▲ **Brizendine Constr. Co.,** 2146 Highland Ave., Birmingham, Ala. Owner Builds. **$3,000,000.** 1,100 HOMES in Crestline Holiday Homes Subdivision, BIRMINGHAM, ALA. John M. Fuller, Stallings Bldg., Birmingham, Ala., archt. CD 5/24/56.

▲† **Blount Bros. Constr. Co.,** Box 1114, Montgomery, Ala. CA **$1,506,154** constr. INTERIM TROOP FACILITIES, incl. 1,000 man troop facility, 12 barracks bldgs., mess hall, 6 admin. bldgs. with day rooms and classroom bldg., all for Ordnance Guided Missile School at Redstone Arsenal, HUNTSVILLE, ALA. U. S. Eng., 2301 Grant St., Mobile, Ala. CD 2/4.

▲† **Pearce & Gresham Constr. Co.,** Box 1527, Decatur, Ala. CA **$2,721,588** rocket and missile guidance control LABORATORY at Redstone Arsenal, HUNTSVILLE, ALA. U. S. Eng., 2301 Grant St., Mobile, Ala. Bids Feb. 20. CD 3/7, under LB.

Nelson Myers General Contractor, Box 1107, Columbus, Miss. CA **$999,585.** 1 story, 20 ft. high, 300x500 ft. concrete blocks, brick facing, aluminum siding WAREHOUSE and OFFICE, ABERDEEN, MISS. City, J. T. Roberts, city clk., City Hall, Aberdeen, Miss. Walker Mfg. Co., Racine, Wis., lessee. Giffels & Rossett, Marquette Bldg., Detroit 26, Mich., archts. Bids Feb. 21.

▲ **E. I. duPont de Nemours & Co.,** duPont and Nemours Bldg., Wilmington, Del. Owner Builds. **$3,000,000** PLANT to produce "Dacron" polyester fiber on a site adjoining its rayon mfg. unit, OLD HICKORY, TENN.

MIDDLE WEST

STATE HIGHWAY LETTINGS

BRIDGES

March 25 Indiana

STREETS AND ROADS

March 25 Indiana

▲ **Wis., Oshkosh**—BA 3/27—City, City Hall, storm and sanitary sewerage sys., $1,000,000. Plans deposit $25, J. Donohue Eng. Co., 606 N. 8 St., Sheboygan, engr. CD 1/17.

▲ **O., Euclid**—BA 3/31—City, City Hall, 585 E. 222nd St., Cleveland, June 23, Sewage disposal plant, Contr. 6 admin. and pretreatment bldg., 4 settling tanks, sludge pumping bldg., renovation and conversion of exist. Imhoff tank bldg. to new flocculation tank bldg. etc., $1,000,000. Plans deposit, $75. Havens & Emerson, 640 Leader Bldg., Cleveland, June 14, engrs. CD 11/9/56

▲ **O., Cleveland**—BA 4/3—Comrs. Cuyahoga Co. Court House, Zone 13, underpass on E. 222 St. at NKP R. R. tracks, Euclid, $1,132,000. Albert S. Porter, Standard Bldg., Zone, 13, engr. Plans deposit $100.

▲† **Ill.,** Scott Air Force Base—DORMITORIES, etc.—BA 4/17—Dpt. U. S. Eng., merchandise mart, Chicago, Zone 54, (1) Airmen's dormitories three 3 story 25,000 sq. ft. bldgs. (2) 1 story, 13,000 sq. ft. dining hall (3) ext. facils for 4 bldgs., sewer, water, electrical, steam, pavement, drainage, grading, sidewalks. $1,250,000. CD 3/29/55.

BUILDINGS—BA

Wis., Prairie du Chien—RESIDENCE HALL—BA 4/9—Campion Jesuit High School, 4 story, bsmnt., 40 x 300 ft. residence hall. $800,000, Plans deposit $35, E. Brielmaier & Sons Co., 735 N. Water St., Milwaukee, Zone 2, archt. CD 11/21.

▲† **Ill., Downey**—HOSPITAL—BA 5/13—Veterans Admin., Munitions Bldg., Wash. D. C., 7 hospital ward buildings, addns. to 13 misc. buildings. Project 12-5272, $20,132,000. (Correction—bid date). CD 3/4.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—State Hy. Dpt., Columbus, Zone 15, O.—**Harrison Constr. Co.,** 1101 Western Ave., Pittsburgh, Pa. CA **$3,856,043,** est. $4,178,400. Proj. SR 1-25-18 AC1-1103 (24) (Village of Lakeville) Type T-71 and structures, 5.044 mi., Ashtabula Co.;

O.—**The De Salvo Constr. Co.,** 3701 Red Bank Rd., Cincinnati, O. CA **$1,912,800,** est. $2,314,100, Proj. SR 4-24.45, 0.00 (SR 123 & 725), F-FG-085 (5) (Village of Germantown) Type T-35 on B-119 and structures, 8.300 mi., Butler and Montgomery Counties;

O.—**The Heffner Constr. Co.,** 509 N. Main St., Celina, O. CA **$2,973,521,** est. $3,265,900. Proj. USR 62-2.12, AC1-609 (10), 576 (6) Type T-71 and structures, 1.760 mi., Franklin Co.;

O.—**Burns Coal Co., Inc.,** P.O. Box 991, Zanesville, O. CA **$2,554,038,** est. $2,807,200. Proj. USR 52 (& SR 650) 3.01, F.-FG-U.-393 (7) (City of Ironton) (Village of Hanging Rock) Type T-71 and structures 3.554 mi., Lawrence Co.;

O.—**A. J. Baltes, Inc.,** 11 Olive St., Norwalk, O. CA **$5,951,731,** est. $6,163,200. Proj. SR 1-5.66 AC1 1105 (24) Type T-71 and structures, 6.887 mi., Medina Co. Grand total **$17,248,132.** Bids Feb. 18. CD 2/28, under LB.

▲ **W. L. Harper Co.,** 2910 Highland, Norwood, O., LB **$1,105,386** (3 bidders) constr. Section A-Ross Run Trunk Sewer; LB **$570,082** (3 bidders), Section B, CINCINNATI, O. Bd. Comrs. Hamilton Co., Court House, Cincinnati, O. Bids Mar. 4. CD 2/17.

▲ **INDIANA**—State Hy. Comn., John Peters, chn., State House Annex, Indianapolis,

Moellering Constr. Co., P. O. Box 1168, Fort Wayne, Ind., CA **$1,078,600,** rein-conc. 2.371 mi. U. S. 52, Contr. R-4293, Boone Co., Bids Jan. 28, CD 2/4 under LB.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,

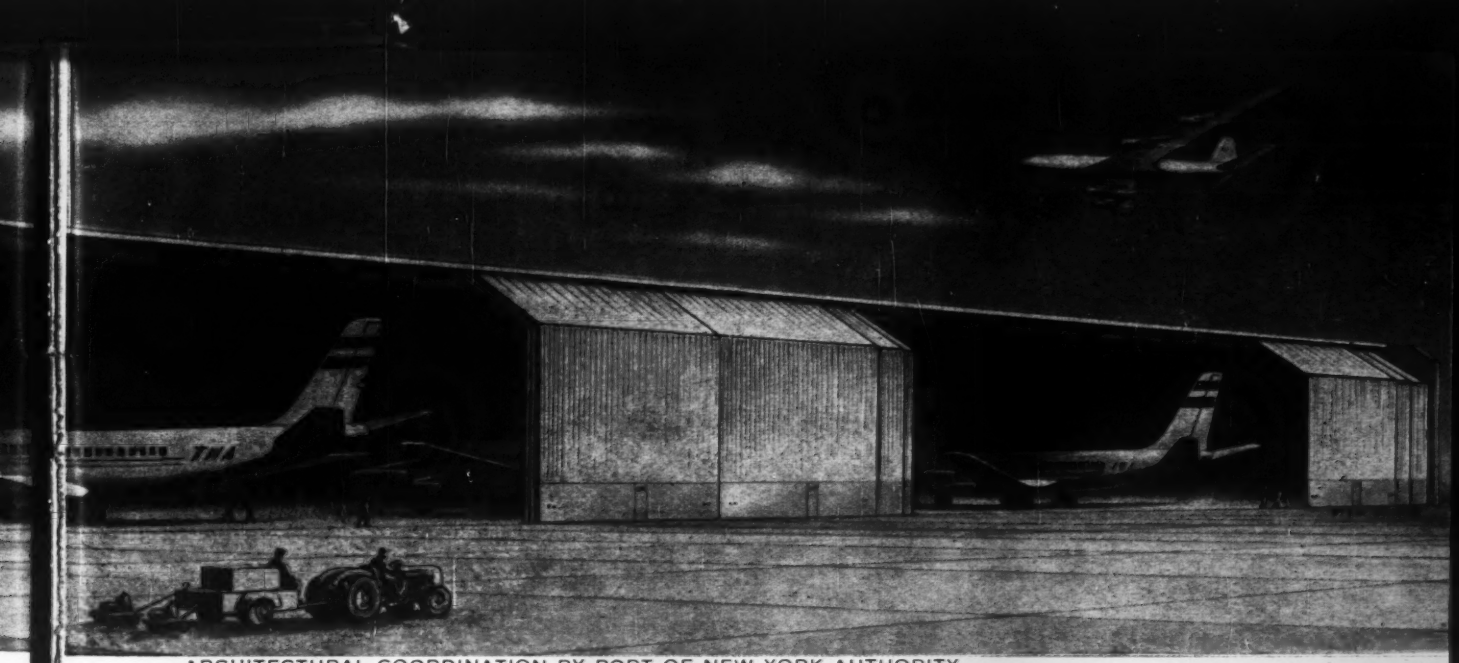
Ill.—**Bituminous Fuel & Oil Co.,** 1st National Bank, East St. Louis, Ill., CA **$522,451,** bit. patching and resurf., Dist. 9 Randolph and Perry Counties;

Ill.—**Howell Asphalt Co.,** Mattoon, Ill., CA **$599,815,** resurf. in Dist. 7 Shelby, Effingham and Jasper Counties;

Ill.—**Jefferson Asphalt Co.,** Mt. Vernon, Ill., CA **$534,632,** resurf. in Dist. 7 Effingham, Clay and Wayne Counties;

Ill.—**Payne & Dolan Inc.,** 38 South Dearborn, Chicago, Ill., CA **$866,249,** wid'n. resurf. US 51 in and north of Normal, McLean Co. Grand Total $2,523,147. Bids Feb. 25, awarded Mar. 5. CD 2/28, under LB.

▲ **Kenny Const. Co.,** 3220 Oakton, Skokie, Ill., LB **$944,490,** Southwest side intercepting sewer, Lyons-Bedford Park-Justice and Willow Springs, CHICAGO, ILL. Metropolitan Sanitary Dist. of Greater Chicago,



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100 E. Erie St., Chicago, Ill. Bids Feb. 27. CD 2/19.
Thomas M. Madden Co., 4610 W. Van Buren St., Chicago, Ill., LB **$224,610,** Upper des Plaines interceptng sewer, Cont. 11-C, Wheeling-Arlington Hts., Mt. Prospect, (Chicago, Ill.)

▲ **Paschen Contractors, Inc.**, 2739 N. Elston Ave., Chicago, Ill., LB **$1,009,760,** NW Expressway, main drain, from Nashville Ave. to Foster Ave., Project BU-265 (30), CHICAGO, ILL. Cook Co., County Bldg., Chicago, Ill. (Correction—contractor) CD 1/24, under CA.

▲ **Santucci Constr. Co.**, 5025 Church St., Skokie, Ill., CA **$1,758,683,** Mt. Prospect combined sanitary relief sewers, adjacent to village of Mt. Prospect, CHICAGO, ILL. Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., **Chicago, Ill. CD 3/7, under LB.**

▲ **MICHIGAN**—State Hy. Dpt., John C. Mackie, comr., Stevens T. Mason Bldg., Lansing,
Lewis & Frisinger, Box 626, 2000 South Industrial Way, Ann Arbor, Mich., CA **$2,886,485,** est. $3,040,000, grading, drainage structure 6.069 mi. and dual 24 concrete paving 9 in. uniform incl. 2 bridges on US-16 relocation from Intersection with M-66 to Interstate with Portland Rd., BI 34044 C 7 RN (I 04-2 6) BI B3 of 34-1 6 C1 RN (I 04-2 6) BI B3 of 34-11 6 C1 RN (I 04-2 6), Hy. Act. 1956, Ionia Co. FAI. Bids Feb. 19. CD 3/3, under LB.

▲ **MICHIGAN**—State Hy. Dpt., John C. Mackie, comr., Stevens T. Mason Bldg., Lansing, Bids opened 3/4,
Mich.—**Rieth-Riley Constr. Co.**, 837 Emmetts St., Battle Creek, Mich., Hillsdale Co., LB **$121,177,** (13 bidders) 24 ft. b. conc. 5.473 mi. M-99 from Ohio State line north in Hillsdale City, SS 30031 C2-R (S 750 3), Hillsdale Co.;
Mich.—**Detroit Concrete Products Corp.**, 19209 W. Danson, Detroit, Mich., LB **$137,048,** (19 bidders), 20 ft. bit. aggreg. surf. 22.54 mi., 4.09 mi. gradation control various sections of County. CS 74-43 C2 (S 364 11) CS 74-50 C4 (S 928-1) CS 74-52 C1 (S 77 3) CS 74-62 C1 (S 875 2) CS 74-63 C1 (S 1550 1) CS 74-64 C1 (S 929 1), Sanalac Co.;
Mich.—**E. C. Nolan, Jarvick Constr. Co., McQuestion & Kauthen and Bairley & Lindley, Inc.**, 4000 W. Jefferson, Trenton, Mich., LB **$871,221,** (11 bidders), 0.938 mi. dual 24 ft. concrete pavement, incl. 2 bridges on Detroit-Toledo Expressway from King Road north to Sibley Rd. B8 82191 C8-RN (I 017-1 5) BI B7 & B8 of 82-1-23 C2-RN (I 017-1 5), FAIS Hy. Act. 1956, Wayne Co. CD 2/14.

BUILDINGS—LB & CA

▲ **The Dunbar Co.**, 8201 Cedar Ave., Cleveland 3, O., CA Est. approx. **$1,000,000** (7 bidders) 3 story, brick, limestone, and wood, HOME for AGED, Kinsman and Lander Rds., BEACHWOOD, O. First Catholic

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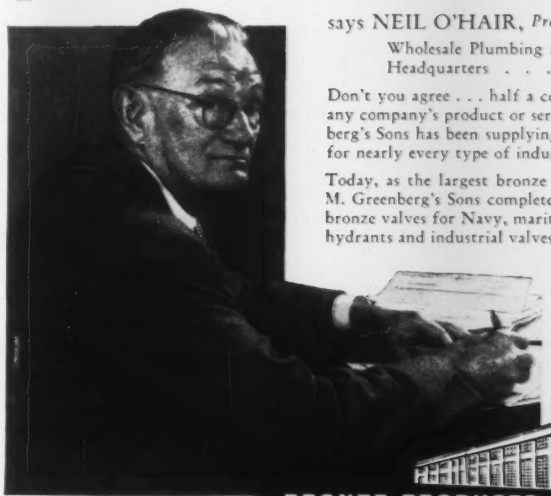

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Ladies Slovak Union, 3756 Lee Rd., Cleveland 28, O. CD 12/11.

▲ **Al. Scheer,** 3325 Koenig Ave., Cincinnati, O., CA remodel 6 story OFFICE BLDG., 7th and Walnut Sts., CINCINNATI, O. John Hibben Co., 7th and Walnut Sts., Cincinnati, O. Bids Feb. 21, awarded March 5. CD 2/11.

▲ **Hoadly Ryan,** 307 E. 4th St., Cincinnati, O. Own Forces, **$1,035,000.** 60—1 floor bsmnt., brick ven. HOMES, off Pippin Rd., CINCINNATI, O. J. S. Wald & Assocs., 2565 Galbraith, Cincinnati, O., archts-engrs. Awarded Mar. 3.

▲ **K-d Constr. Co.,** 6089 State Rd., Parma 29, O., Own Forces, **$1,390,000,** 100 HOMES, Miles and E. 154th St., CLEVELAND, O. Howard Greene Design Service, 2138 Lee Rd., Cleveland 18, O., archts.

▲ **B. G. Danis Co.,** 1518 E. First, Dayton, O. CA **$1,582,832.** general contract, tri-level bldg., Nettie Lee Roth HIGH SCHOOL, DAYTON, O. Bd. Educ., 348 W. First St., Dayton, O. Bids Feb. 24, awarded Feb. 27. CD 3/6/58, under LB:
H. J. Osterfeld Co., 417 S. Main, Dayton, O. CA **$412,000.** plumbing and heating contract, tri-level bldg., Nettie Lee Roth HIGH SCHOOL, (Dayton, O.)

M. Helper & Sons, Inc., 4118 Lee Rd., Cleveland 28, O. Own Forces, **$800,000,** 20 HOMES, SHAKER HEIGHTS and BEACHWOOD, O. Designed by Mr. M. Helper, c/o owner.

▲ **Joseph Bucheit & Sons,** 4040 Simon, Youngstown, O. CA **$1,589,000,** 4 story North Side HOSPITAL addn., YOUNGSTOWN, O. Youngstown Hospital Assn., Gypsy Lane and Goletta, Youngstown, O. Awarded Mar. 6. CD 11/21.

H. B. Barnard Co., 38 S. Dearborn St., Chicago, Ill., CA **$905,000,** Lying-In addn. Billings HOSPITAL, CHICAGO, ILL., University of Chicago, 5801 S. Ellis Ave., Chicago, Ill. Schmidt Garden & Erickson, 104 S. Michigan Ave., Chicago, Ill., archts. CD 3/11.

▲ **George Sollitt Constr. Co.,** 109 N. Dearborn St., Chicago, Ill. CA **$2,770,671,** WOMEN'S RESIDENCE HALL; CA **$1,174,652,** DINING HALL for Women's Residence Hall, CHICAGO, ILL. University of Chicago, 5801 S. Ellis Ave., Chicago, Ill. Eero Saarinen & Assocs., W. Long Lake Rd., Bloomfield Hills., Mich., archts. CD 3/6.

▲ **Fred Berglund & Son, Inc.,** 8410 South Chicago Ave., Chicago, Ill. CA **$1,298,511,** Charles Stewart Mott Bldg., INDUSTRIAL RELATIONS HALL, 1225 E. 60th St., CHICAGO, ILL. University of Chicago, 5801 S. Ellis Ave., Chicago, Ill. Schmidt Garden & Erickson, 104 S. Michigan Ave., Chicago, Ill., archts. CD 11/29.

▲ **George A. Fuller Co.,** 111 W. Washington St., Chicago, Ill., CA **$1,200,000,** 100,000 sq. ft. MANUFACTURING PLANT, COMPRESSOR BLDG., BOILER HOUSE, on 770 acres, NW cor. Ill., 83 and Devon, ELK GROVE, ILL. Hotpoint, Inc., Div. General Electric, 5600 W. Taylor St. Chicago, Ill. Albert Kahn Assoc., Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., archt.

▲ **Kaufman & Broad Bldg. Co.,** 15917 West 7-Mile Rd., Detroit, Mich., Owner Builds **$5,500,000,** Home Haven Sub-Division, Little Mack Rd. north 15-mile Rd., CLINTON, MICH.

▲† **Knapp-Stiles Assocs.,** 1600 Linden St. S.E., Grand Rapids, Mich., LB **$5,224,000,** 340 unit HOUSING, K. I. Sawyer Air Force Base, MARQUETTE, MICH. U. S. Eng., 1101 Washington Blvd., Detroit, Mich. Bids Feb. 13. CD 2/4.

▲ **R. E. Dailey,** 21657 Telegraph Rd., Detroit, Mich. CA **$1,340,000,** general contract HOSPITAL ADMINISTRATION BLDG., Plymouth State Home and Training School, PLYMOUTH, MICH. State, A. N. Langlius, dir. State Bldg. Dpt., Lewis Case Bldg., Lansing, Mich. Bids Feb. 20. CD 3/6, under LB:
Goss Mechanical Contractors, 3409 Linden, Detroit, Mich. CA **$570,388,** mechanical (Plymouth, Mich.)

WEST OF MISSISSIPPI

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
BRIDGES
March 28 Missouri
STREETS AND ROADS
March 28 Missouri

▲ **Minn., St. Paul**—BA 3/25—City, O. P. Simon, Jr., purch, agt., 253 City Hall, purification and filtration plant addn. at McCarron's Lake. $2,000,000. CD 4/5.

▲ **Minn., St. Louis Park**—BA 3/31—City, J. Justad, clk., constr. lateral sanitary sewer Proj. No. 58-3, Section A, 68,800 lin. ft. sanitary sewer, sewage lift station, 1,300 lin. ft. water service connections; Section B, 73,300 lin. ft. sanitary sewer, 100 GPM sewage lift station, 13,800 lin. ft. water service connections. $2,000,000. Plans deposit $50 per section. Orr-Schelen, 1104 Currie Ave., Minneapolis, engrs.

▲† **South Dakota**—BA About 4/10—U. S. Eng., 1709 Jackson St., Omaha, Neb., furnishing, installing seven 89,474 kva hydraulic turbine generators at Oahe Dam Site, Oahe Reservoir Proj., near Pierre. Inv. 25-066-58-60. Bids Jan. 7 rejected. CD 1/15, under LB.

▲† **Minn., Minneapolis**—HANGAR, etc.—BA 4/16—St. Paul Metropolitan Airports Comm., 2449 University Ave., St. Paul 14, (1) furnish, erect hangar structural steel, steel joists, $1,400,000 (2) sliding hangar doors and erection for hangar bldg. $800,000, for Northwest Airlines Main Base at Wold-Chamberlain Field. W. Butler Co., 1300 Minngsota Bldg., St. Paul, archt. CD 6/17/55.

▲† **Okla., Oklahoma City**—AIR BASE IMPRVS.—BA 4/16—U. S. Eng., Box 61, Tulsa, Zone 2, 28,000 sq. ft. terminal warehouse bldg., Tinker Air Force Base, $1,000,000. Hudgins Thompson & Ball, 1411 Classen, engrs. (Correction—Bid date). CD 2/18.

▲† **Texas**—BA About 4/17—U. S. Eng., 606 Santa Fe Bldg., Galveston, seawall exten., ENG-41-243-58-43. $1,000,000-$1,500,000. CD 11/6/52.

BUILDINGS—BA

▲ **Minn., Chisholm**—SCHOOL—BA 3/26—Bd. Educ., V. Gregarich, clk., 1 story, 104 x 254 ft. elementary school, $1,000,000. Plans deposit $25. T. J. Shefchick, 307 Lonsdale Bldg., Duluth, archt. CD 5/29.

▲† **Mo., Grandview**—HOUSING—BA 3/26—Procurement Officer, Bldg. 541, Base Theater Bldg., Richards-Gebaur Air Force Base, 610 family type Capehart dwelling units, single and double, frame, Richard-Gebaur Air Force Base, No. 23-608-58-53. $11,500,000. Plans deposit $100. Geo. Dahl, 2101 N. St. Paul, Dallas, Tex. and Louis H. Geis, 7920 State Line, Kansas City, Mo., archts. CD 2/19.

▲ **Minn. Collegeville**—RESIDENCE HALL—BA 3/28—St. John's University, Abbott B. Dworschak, Collegeville, L shape two 4 story connecting wings student residence hall. $1,600,000. Plans deposit $50. M. Breuer & Assocs., 201 East 57 St., New York 22, N. Y., assoc. archts. Traynor & Hermanson, Box 56, St. Cloud, archts. CD 1/4, under LB.

▲ **Ark., Conway**—COTTAGES, etc.—BA 4/2—State Purchasing Officer's Dpt., State Capitol, Little Rock constr. 8 cottages, school, etc., U. S. 64-65, for Arkansas State Children's Colony, Bd. Directors, David B. Ray, Supt., Union Life Bldg., Little Rock and Conway. $1,200,000. Ginocchio, Cromwell & Assocs. 416 Center St., Little Rock, archts. CD 8/28.

▲ **Colo., Littleton**—SCHOOLS, etc.—BA 4/2—Bd. Educ., School Dist. No. 6, Arapahoe Co., 176 S. Grant Ave., 2 story, 60 x 196 ft. Junior High School, $1,131,000. Harbert & Gillum, 939 Grant, Denver, archts. Earl Chester Morris, 122 E. 19th Ave., Denver, engr. Arthur M. Riley Jr., 435 N. Cedar, Littleton, Colo., archt. CD 12/3/57.

▲† **N. M., Albuquerque**—HOUSING—BA About 4/8—U. S. Eng., Box 1538, Albuquerque, 213 unit Capehart Housing, Inv. No. ENG-29-005-58-8. $3,195,000. CD 10/20/55.

▲ **Minn., St. Paul**—HOUSING—BA 4/8—Regents of the University of Minnesota, C. A. Smith, purch. agt., 404 Administration Bldg., Minneapolis, Zone 4, married students' housing on St. Paul Campus. $1,000,000. Plans deposit $25. Magney, Tusler & Setter, 303 Roanoke Bldg., Minneapolis, archts. CD 6/7.

▲ **Mo., St. Louis**—HOSPITAL—BA 4/11—Christian Hospital, 4400 N. Newstead Ave., Zone 15, 6 story, bsmnt., 85 x 138 ft. brick, bedford stone, rein.-con. hospital addn. with 72,530 sq. yd. floor space and extensive revamping present bldg. $2,000,000. Syl. G. Schmidt & Assocs., Railway Exhange Bldg., 611 Olive St., Zone 1, Mo., archts.-engrs. CD 6/14.

▲† **N. M., Alamogordo**—HOUSING—BA On Or About 4/22—Directorate of Procurement, Base Theatre, Holloman Air Force Base, 400 family housing units, Inv. 29-600-58-92. Plans deposit $100. CD 8/24/56.

▲ **Ark., Pine Bluff**—HOSPITAL—BA 6/1 (tentative)—Jefferson Co., Court House, Pine Bluff, 234-bed 150,000 sq. ft. floor space, county hospital, parking areas, 40th and Mulberry Ave. $4,500,000. Reed & Willis, National Bldg., Pine Bluff and Wittenberg, Delony & Davidson, Pyramid Life Bldg., Little Rock, assoc. archts, Rawland E. Blaylock & Assocs., Pyramid Life Bldg., Little Rock, engrs. CD 5/6.

BUILDINGS—SLC

▲ **Tex., Longview**—YMCA BLDG.—Young Men's Christian Assn., Longview, soon lets contract, YMCA Bldg. $1,000,000. Wilson, Morris, Crain & Anderson, 3330 Graustark, Houston, archts. CD 12/4.

HEAVY CONSTRUCTION—LB & CA

▲† **Westinghouse Electric Corp.,** 707 Boyle Bldg., Little Rock, Ark. CA **$1,921,720.** furnishing main generators, Units 3 and 4, for Table Rock Dam and Reservoir, f.o.b. Branson, IFB CIVENG-03-05-58-22B, MISSOURI. U. S. Eng., P.O. Box 867, Little Rock, Ark. CD 9/5, under Missouri and Arkansas.

† **Standard Dredging Corp.,** 80 Broad St., New York, N. Y. CA **$979,480** dredging Brownsville channel, Brownsville, Cameron Co., TEXAS. U. S. Eng., 606 Santa Fe Bldg., Galveston, Tex. Bids Feb. 20.

▲ **Vilbig Constr. Co.,** P. O. Box 5926, Dallas, Tex. LB **$1,089,900,** est. $1,200,000 constr. Champion Creek Dam on Champion Creek near Colorado City TEXAS. Texas Elec. Service Co., J. B. Thomas pres. gen. mgr., Electric Bldg., Fort Worth, Tex. bids Mar. 7. CD 2/26.

BUILDINGS—LB & CA

▲ **Watson Constr. Co.,** 1409 Willow St., Minneapolis, Minn., LB **$4,298,000** (9 bidders), general contract 6 story, steel frame, 44,884 sq. ft. on each floor, STATE OFFICE BLDG., incl. 3 penthouses, Capitol Grounds, Cedar St. between Central Ave. and Columbus Ave., ST. PAUL, MINN. State, Dpt. Admin., Director of Procurement, 19 State Capitol, St. Paul, Minn. Bids Mar. 6. CD 2/5;
Grudem Bros. Co., 635 North Prior Ave., St. Paul, Minn., LB **$764,750** (5 bidders), mechanical (St. Paul, Minn.);
Batzli Electric Co., 710 University Ave., St. Paul, Minn., LB **$597,879** (5 bidders), electrical (St. Paul, Minn.);
Pierre Aircon Co., 525 Jackson St., St. Paul, Minn., LB **$66,764** (11 bidders), ventilating (St. Paul, Minn.)

▲ **The Weitz Co., Inc.,** 406 Fleming Bldg., Des Moines, Iowa, CA **$1,084,730,** POST OFFICE (lease-purchase project) BURLINGTON, IOWA. General Services Admin., c/o William Holloway, regional dir., 2306 Bannister Rd., Kansas City, Mo. Bids Feb. 14, awarded Mar. 7. CD 2/24, under LB.

▲ **Sharp Brothers Constr. Co.,** 95 and Troost, Kansas City, Mo., LB **$3,081,349** (5 bidders) Pennway Plaza HOUSING, 250 units in 42 buildings, KANSAS CITY, MO. Kansas City Housing Auth., Forrest D. Byers, chn., 1220 Independence Ave., Kansas City, Mo. Bids Mar. 6. CD 2/11.

▲ **J. W. Bateson Co., Inc.,** P.O. Box 13307, Walnut Hill Station, Dallas, Tex. LB **$6,844,000** POST OFFICE and COURTHOUSE (lease-purchase project) OMAHA, NEB. General Services Admin., F St., between 18th and 19th Sts. N.W., Wash., D. C. Bids Mar. 11. CD 2/5.

▲ **Mid-Valley Constructors, Inc.,** 4241 Gulf Freeway, Houston, Tex. CA Est. **$7,000,000-$8,000,000.** PAPER MILL expan., EVADALE, TEX. East Texas Paper & Pulp Co., Evadale, Tex. Bids Feb. 17. CD 2/17.

▲ **Continental Can Co.,** 100 E. 42nd St., New York 17, N. Y., cancelled bids container mfg. PLANT, TYLER, TEX. $2,000,000. CD 2/3.

▲ **F. J. Kirchhof Constr. Co.,** 700 Lawrence, Denver, Colo., LB **$1,833,081,** 6 story, bsmnt., approx. 69 x 200 ft., HOSPITAL Addn. DENVER, COLO. Presbyterian Hospital, E. 19th Ave. and Gilpin, Denver, Colo. Bids Mar. 5. CD 2/11.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS
STREETS AND ROADS
March 27 Nevada

▲ **Washington**—SUBSTATION—BA 3/27—Bonneville Power Admin., 1001 N.E. Lloyd Blvd., Portland, Ore., constr. 115-kv addns. to Cosmopolis substation, Inv. 8683, Plans deposit $20, L. C. Stewart, c/o owner engr. CD 2/5/51.

▲ **Ore., Portland**—BA 3/28—City, Bureau Water, City Hall constr. 1,010 ft. diversion tunnel, 15 ft. diam. and 1,720 ft. 7 in. diam. fresh water tunnel, both steel lined, intake structures outlet works, station service generators and controls, Bull Run Watershed Proj. Stevens & Thompson, 2234 SW 5th, Portland, Ore., engrs. Constr. to start early in May.

▲ **Utah, Salt Lake City**—BA 4/15—Metropolitan Water Dist. Fisher Harris, mgr., Tribune Bldg., water treatment plant at Little Cottonwood Creek $6,500,000. Plans deposit $100. Headman, Ferguson & Carollo, 330 N. 3 St., Phoenix, Ariz. engrs. CD 8/30/54.

BUILDINGS—BA

▲ **Calif., Bellflower**—SCHOOL—BA 3/28—Bellflower Unif. School Dist. 16703 S. Clark Ave., high school Bellflower St. $1,500,000. CD 8/31/56.

▲ **Calif., San Bernardino**—HOSPITAL ADDN.—BA 3/31—Bd. Supervs. San Bernardino Co., Courthouse, Phase 2, 5 story, rein.-con. addn. to San Bernardnio County Hospital. $2,500,000. Jay Dewey Harnish & W. W. Fickes, 222 E. "B" St., Ontario, archts. (Correction—bid date). CD 2/11.

HEAVY CONSTRUCTION—LB & CA

Key Constr. Co., 1601 Taylor Way, Tacoma, Wash. CA **$934,680** (11 bidders), two 230 kva steel tower transmission lines 7 mi. from Priest Rapid Dam to BPA Midway sub-station near Vernita, Grant Co. (part of multi-million-dollar Priest Rapids Dam Proj.), WASHINGTON. Grant County Public Utility Dist., Ephrata, Wash. Bids Jan. 15. Harza Eng. Co., 400 West Madison St., Chicago, Ill., engr. CD 1/22, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,
E. L. Yeager Co., Yeager Constr. Co., Bert C. Altfillisch, Altfillisch Constr. Co., & Lowe & Watson, P.O. Box 84, Riverside, Calif. CA **$3,772,000,** grading, paving 7.9 mi. San Diego Freeway US Hy. 101 and between 0.4 mi. south of Trabuco Creek and 0.3 mi. north of Niguel Rd., incl. freeway and frontage road bridges over Trabuco Creek, bridges over Oso and Alison Creeks, the El Toro overhead and Oso Rancho and Niguel interchanges, VII Ora-2 A. B., Orange Co. Bids Feb. 20, awarded Mar. 6. CD 2/25, under LB.

▲† **Clyde W. Woods & Sons Constr. Co.,** 6900 Tujunga Ave., North Hollywood, Calif. LB **$1,117,565.** (10 bidders) imprv. Upper Rio Hondo Channel, Lower Azusa Rd. to Valley Blvd. River Mile 14.91 to River Mile 13.75, Los Angeles Co., ENG-04-353-58-11, CALIFORNIA. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Mar. 6. CD 2/14.

Continued on page 164

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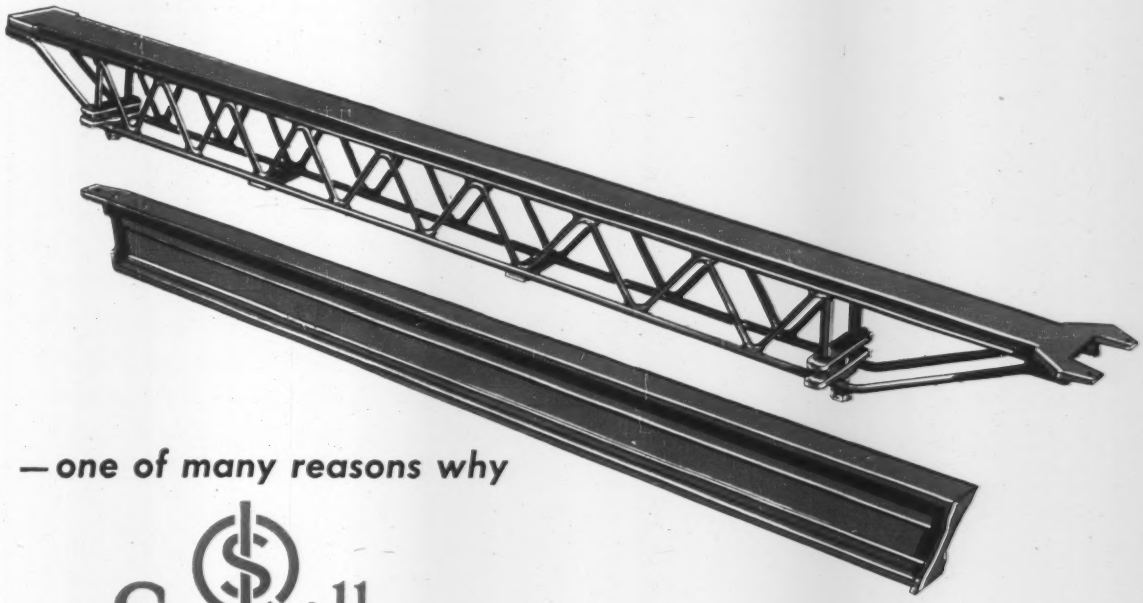

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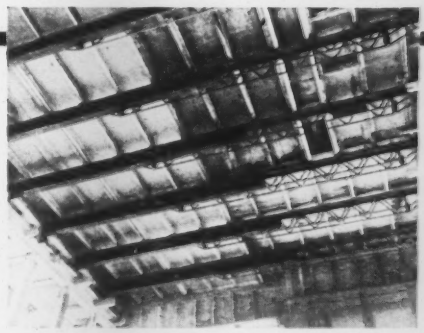

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(Continued from page 162)

▲ **General American Transportation Co.**, 900 Wilshire Blvd., Los Angeles, Calif. CA **$1,325,726** furnish, deliver, erect and test complete 500,000 cu. ft. gas holder and foundation, east of San Gabriel River and south of Carson St. LONG BEACH, CALIF. Long Beach City Council, City Hall, 205 W. Broadway, Long Beach, Calif. Bids Jan. 29, awarded Feb. 28. CD 1/25.

▲ **Vido Artukovich & Sons, Inc.**, 11155 Rush St., El Monte, Calif. LB **$3,142,505.** (11 bidders), 6 mi. 78 in. pipe line Second San Diego Aqueduct in Riverside and San Diego Counties, near Temecula, LOS ANGELES, CALIF. Metropolitan Water Dist. of Southern California, 306 W. 3 St., Los Angeles, Calif. Bids Mar. 6. CD 2/10.

BUILDINGS—LB & CA

▲ **Stearns-Roger Mfg. Co.**, 665 Bannock, Denver, Colo. CA Over **$10,000,000,** design and construct COPPER REDUCING PLANT, HAYDEN, ARIZ. Kennecott Copper Co., Kearns Bldg., Salt Lake City, Utah.

▲ **Home Planners, Inc.**, Everett, Wash., Day Labor, **$1,000,000,** 62 HOMES in Shannon Heights area for employers of The Texas Co., ANACORTES, WASH.

▲ **Albert Vik & Son Constr. Co.**, 160 Madison Ave., Eugene, Ore., CA **$1,000,000,** HOME for the AGED, EUGENE, ORE. Saverson Memorial Home Assn., 3500 S. Hilyard St., Eugene, Ore. Frank N. Hitchcock, 877 Wilment, Eugene, Ore., archt. Awarded Mar. 6.

▲ **Fred S. Macomber**, 2727 North Cedar Ave., Fresno, Calif. LB **$1,307,000** Sched. B, lift slab constr. LB **$1,608,000** Sched. A, cast in place (4 bidders) for three 3 story rein.-con. brick, masonry, concrete RESIDENCE HALLS and certain site development at Fresno State College, FRESNO, CALIF. State Div. Architecture, 1120 N. St., Sacramento, Calif. Bids Mar. 11. CD 2/18.

▲ **William Simpson Constr. Co.**, 2401 Beverly Blvd., Los Angeles, Calif. CA **$2,000,000.** 8 story Main OFFICE BLDG., GLENDALE, CALIF. Glendale Federal Savings & Loan Corp., 122 W. Broadway, Glendale, Calif. Bank Bldg. & Equipment Corp., 1130 Hampton Ave., St. Louis, Mo., archts. (Correction—architects address). CD 2/26.

▲ **W. C. Crowell**, 170 E. California St., Pasadena, Calif. LB **$1,126,100.** (7 bidders), constr. Bonita Union HIGH SCHOOL, LA VERNE, CALIF. Bonita Union High School Dist., 1124 Bonita Ave., La Verne, Calif. Bids Mar. 5. CD 2/14.

▲ **L. E. Dixon**, 409 South California St., San Gabriel, Calif. LB **$2,716,000.** (14 bidders), 7 story Harbor Dpt. ADMINISTRATION BLDG., LONG BEACH, CALIF. Long Beach Harbor Dpt., 1333 El Embarcadero, Long Beach, Calif. Bids Mar. 6. CD 2/11.

▲ **Wm. Simpson Constr. Co.**, 2401 Beverly Blvd., Los Angeles, Calif. CA **$2,000,000,** 6 story, 80x150 ft. OFFICE BLDG., Wilshire Blvd., LOS ANGELES, CALIF. Southern Federal Savings & Loan Assoc., 3871 Wilshire Blvd., Los Angeles, Calif.

▲ **Robert E. McKee Co.**, 4700 San Fernando Rd., West Los Angeles, Calif. CA **$16,800,000** general constr. 25 story, 3 bsmnts., rein.-con. 850,000 sq. ft. Kaiser Center OFFICE BLDG. and for constr. 5 level GARAGE and SHOPS structure, 2036 Webster St. OAKLAND, CALIF. Henry J. Kaiser, 1924 Webster St., Oakland Calif. Bids Feb. 21. CD 2/27, under LB.

▲ **Evert & Payton**, 717 Main St., Santa Paula, Calif. CA **$1,034,889** 1 story, frame, stucco 5 wings of back to back classrooms, shops and music bldg. Hueneme HIGH SCHOOL, at Bard Rd. and C St., Port Hueneme OXNARD, CALIF. Oxnard Union High School Dist., 309 S. K St., Oxnard, Calif. Bids Feb. 19. CD 2/26, under LB.

▲ **Haas & Haynie**, 275 Pine St., and **Ben C. Gerwick**, 417 Market St., San Francisco, Calif. (joint venture) CA pilings and foundation work for new 15 story HEADQUARTERS BLDG., SAN FRANCISCO, CALIF. Bethlehem Pacific Coast Steel Corp., 20th and Illinois Sts., San Francisco, Calif. CD 2/20/57.

▲ **Santa Ana School Dist.**, 1415 French St., Santa Ana, Calif. cancelled bids to have been opened Mar. 25, Del Rio SENIOR HIGH SCHOOL (formerly Fairview High School) SANTA ANA, CALIF. **$2,500,000.** Will re-advertise. CD 3/7.

▲ **James I. Barnes Constr. Co.**, 1119 Montana Ave., Santa Monica, Calif. CA **$1,148,700,** 2 story, 45,000 sq. ft. concrete block SCIENCE BLDG. UNIT NO. 2, Goleta Campus, SANTA BARBARA, CALIF. University of California, Santa Barbara Campus, Goleta, Santa Barbara, Calif. Bids Feb. 6. CD 2/10, under LB.

CANADA

HEAVY CONSTRUCTION—BA

▲ **Man., Winnipeg**—BA 4/9—City, City Hall, fabrication and erection of steel superstructure for Red River Bridge, Total est. $5,912,000. CD 11/4/55.

▲† **Newfoundland, Stephensville**—AIR BASE IMPRVS—BA 4/30—U. S. Eng., Eastern Ocean Dist. Office, Ottawa Defense Constr., 56 Lyon St., Ottawa, Ont., 200-unit Family Housing and services, Harmon Air Base, $1,500,000. CD 2/24.

BUILDINGS—BA

Que., Chateauguay—APARTMENTS—BA 3/14—Quebec Legion Memorial Housing Corp., c/o Archibald, Illsley & Templeton, archts., 1440 St. Catherine St. W., Montreal, 128-unit apartments, near Veterans' Housing Project, $900,000. CD 1/18/57.

▲ **Alta., Edmonton**—NURSES RESIDENCE, etc.—BA 3/31—Royal Alexandra Hospital Bd., 111th Ave., nurses' residence and training school. $2,700,000. Rensaa & Minsos, 9130 Jasper Ave., archts. CD 1/10/57.

▲ **Newfoundland, St. John's**—HOUSING—BA 4/3—Central Mortgage & Housing Corp., 357 Water St., St. John's, 146-row housing and apartment units with related services, Elizabeth Ave. and Whitney St. $2,000,000. CD 2/18.

HEAVY CONSTRUCTION—LB & CA

▲ **Piggott Constr. Ltd.**, Pipeline Division, Calgary, Alta., CA Est. **$10,000,000,** 145 mi. 24 in. pipe line from point near Pincher Creek gas field to main line junction at Princess, ALBERTA. Alberta Gas Trunk Line, Co. Ltd., 320 9th Ave. W., Calgary, Alta. CD 1/5/56.

▲ **Atlas Constr. Co. Ltd.**, 4781 St. Catherine St. W., Montreal, Que., CA About **$1,000,000** (20 bidders) concrete Bridge Piers 16A, 17A, D-19-24 incl., for railway line diversion, Victoria Bridge, MONTREAL, QUE. Canadian National Railways, 355 McGill St., Montreal, Que. Bids Feb. 10, Awarded Mar. 3, CD 1/16.
Magil Constr. Ltd., 410 Gratton St., St. Laurent, Que., CA **$125,000,** constr. concrete Bridge Piers 29-38, Victoria Bridge, (Montreal, Que.).

BUILDINGS—LB & CA

▲ **Burns & Dutton Concrete & Constr. Co. Ltd.**, Box 636, Edmonton, Alta. CA About **$1,500,000.** 1 story, 264x300 ft. masonry, steel DIESEL SHOP to contain 20 tracks, at Calder Yard, EDMONTON, ALTA. Canadian National Railways, B. Chappell, chf. engr. Western Region, CNR Station, Winnipeg, Man. Bids Jan. 6, awarded Mar. 4. CD 12/27.

Foundation Co. of Canada Ltd., 902 11th Ave. S.W., Calgary, Alta. CA **$960,000.** erect new BREWERY to have annual cap. of 75,000 bbl., CRESTON, B. C. Interior Breweries Ltd., Creston, B. C. McKeen & Gray, 355 Burrard St., Vancouver, B. C., archts. Awarded Mar. 1. CD 4/2/57.

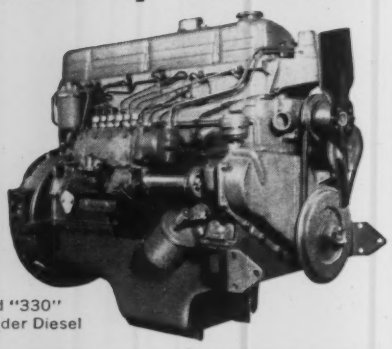
▲ **Ball Bros. Ltd.**, 49 King St. E., Kitchener, Ont., CA **$1,686,500,** HOSPITAL and CHAPELS BLDG. No. 2, and ACCOMMODATION BLDG. No. 3, Eastern Penitentiary site, 10 mi. NE of KINGSTON, ONT. Dpt. Justice, Penitentiaries Branch, Justice Bldg., Ottawa, Ont. Lt. Col. R. W. Catto, c/o owner, ch. engr. CD 2/19, under LB.

▲ **Soo Mill & Lumber Co.**, North St., Sault Ste. Marie, Ont., Owner Builds, **$1,000,000,** HOUSING PROGRAM, Poplar Grove and Forest Glen subdivisions, SAULT STE. MARIE, ONT.

Ball Bros. Ltd., 49 King St. E., Kitchener, Ont., CA **$780,200** (7 bidders) 3 story, 70x250 ft. precast concrete, brick constr. with limestone trim. CHEMISTRY BLDG., WATERLOO, ONT. Waterloo College, General Office, Dearborn Ave. W., Waterloo, Ont. Bids Feb. 27, awarded Mar. 4. CD 3/7, under LB.

(Continued on page 168)

NOW, another modern diesel from FORD



Ford "330" 6-cylinder Diesel

330 cu. in. displacement

ENGINE SPECIFICATIONS		"220"	"330"
Basic Model		X	Y
Number of Cylinders		Four	Six
Bore and Stroke—Inches		3.94 x 4.52	3.94 x 4.52
Displacement—Cubic Inches		220	330
Brake Horsepower	Dynamometer	61 @ 2250	96 @ 2250
	Continuous	49 @ 2250	77 @ 2250
Torque	Dynamometer	152#' @ 1600	236#' @ 1500
	Continuous	131#' @ 1600	189#' @ 1500
Compression Ratio		16 to 1	16 to 1

For dependable, heavy-duty service, you'll find the new Ford "330" Diesel hard to beat. It is quality-built throughout for quick all-weather starting, dependable performance and top operating economy.

Ford "330" Diesel features include: removable "wet" cylinder sleeves that eliminate costly reboring; Four-Way Injectors for greater economy; and rotating exhaust valves for better seating, longer life.

For power that's right for your particular application, choose either the new Ford Heavy Duty "330" Diesel or the Ford "220" Diesel.

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RUST-OLEUM CORPORATION, 2333 Oakton St., Evanston, Ill.
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ALLIS-CHALMERS
☐ H-1 Orange

J. I. CASE
☐ H-6 Flambeau Red
☐ H-28 Desert Sunset

CATERPILLAR
☐ H-4 Yellow

JOHN DEERE
☐ H-3 Green
☐ H-10 Yellow
☐ H-11 Red

MASSEY-HARRIS
☐ H-18 Yellow
☐ H-19 Red
☐ H-23 Straw Yellow

OLIVER
☐ H-12 Green
☐ H-13 Red
☐ H-14 Orange
☐ H-22 Yellow

EUCLID
☐ H-9 Green
☐ H-27 Light Green

FORD
☐ H-20 Gray
☐ H-21 Red

MINNEAPOLIS-MOLINE
☐ H-16 New Prairie Gold
☐ H-17 Red

FERGUSON
☐ H-7 Gray

INTERNATIONAL
☐ H-2 Red
☐ H-8 Blue
☐ H-15 Green

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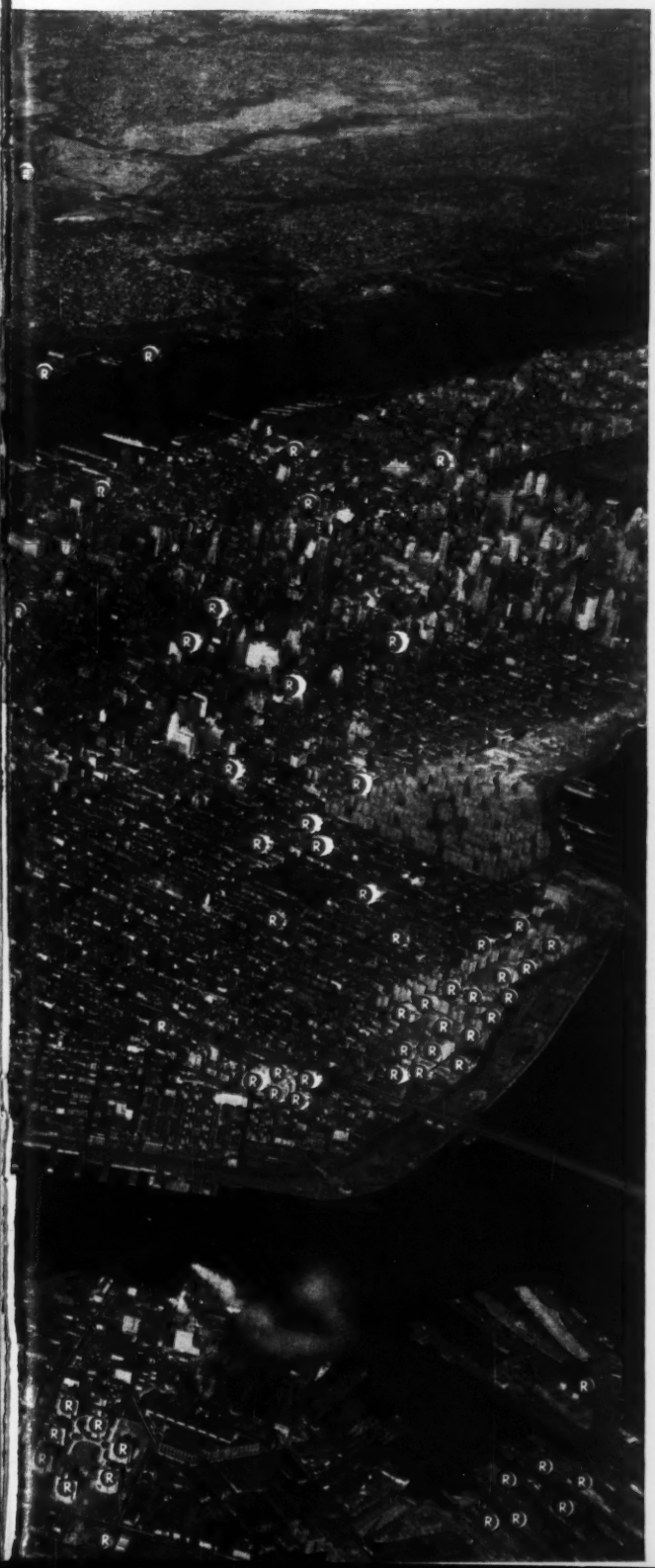

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Continued from page 164

▲ **Constant & Katz**, c/o Ben-Ami Shulman, archts., 5174 Cote des Neiges Rd., Montreal, Que., Owner Builds, $1,000,000, 5 story, bsmnt. for garage, 88 x 200 ft. concrete fdn., rein.-con. frame, 100-suite, APARTMENT, MONTREAL, QUE.

▲ **Pigott Constr. Co. Ltd.**, 1510 Drummond St., Montreal, Que. CA About $4,000,000, completing 10 story rein.-con., slab, Indiana limestone exterior, brick backing, terra-cotta furring, DEPARTMENT STORE extension, incl. 2 more sections, ramp off Burnside St. and tunnel under Victoria St., MONTREAL, QUE. The T. Eaton Co. Ltd., 677 St. Catherine St. W., Montreal, Que. Wiggs, Walford, Frost & Lindsay, 4335 Sherbrooke St. W., Montreal, Que., engrs. Bids Mar. 5. CD 2/19.

▲ **Smith Bros. & Wilson Ltd.**, 2135-6th Ave., Regina, Sask., CA Est. $3,000,000, 3 story, bsmnt. 140x300 ft. rein.-con. DEPARTMENT STORE, SASKATOON, SASK. Hudson's Bay Co., 79 Main St., Winnipeg, Man. Bids Feb. 25. Awarded Mar. 3. CD 1/29.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **M. W. Kellogg Co.**, 711 3 Ave., New York, N. Y., U.S.A., CA 24,000 bbl. per day three unit addn. to oil refinery, CONCON, CHILE. Empresa Nacional Del Petroleo, Govt. of Chile, Santiago.

U. S. POSSESSIONS

BUILDINGS—BA

▲† **Guam, Mariana Islands**—DORMITORY, etc.—BA 5/1—Area Public Works Officer, Marianas, P.O. Box 35, Agana, airmen's dormitory, officers quarters utilities, special weapons training aircraft maintenance shop, aircraft washrack, NBy 3386. $4,000,000. Plans deposit $235. CD 8/5.

BUILDINGS—LB & CA

▲† **Richards Constr. Co.**, P.O. Box 1187, Studio City, Calif. CA $8,794,085. 650 Capehart HOUSING UNITS, concrete slab floors, frame walls, ranges, Marine Corp Air Station, NBy 12526, KANEOHE BAY, T. H. Dist. P. Wks Office, 14th N. D., Pearl Harbor, T. H. CD 2/5, under LB.

▲† **Murray & Saunders**, 2166 S. Main St., Santa Ana, Calif. LB $3,268,000. (6 bidders), 248 unit Capehart HOUSING, (incl. sewage, roads, etc.), NBy 14616, Camp H. M. Smith & Naval Ammunition Depot, MANANA, T. H. Dist. P. Wks. Office, 14th N.D., Pearl Harbor, T. H.

PROPOSED PROJECTS

WATER SUPPLY

▲ **Tex., Coleman**—City, constr lake (for water supply) $1,280,000; 14 mi. water supply line to Coleman limits (for domestic water supply). Forrest & Cotton, 600 Vaughn Bldg., Dallas, consult. engrs.

▲ **Ont., Riverside**—Town, Town Hall, water filtration plant, $1,000,000.

SEWERS, WASTE DISPOSAL

▲ **Calif., Glendale**—City, City Hall, $3,250,000 bond election June 3, sewage plant and outfall sewer. CD 11/22/44.

▲ **Ill., Chicago**—Metropolitan Sanitary Dist. of Greater Chicago, 100 E. Erie St., Calumet treatment works outfall sewer 127th and Indiana, $1,000,000; Calumet intercepting sewer Cont. 17-D, W. of Michigan-Central R.R. tracks from 130th St. to south of Calumet River, Chicago-Dolton, $900,000; sewage treatment plant and pumping station, Joe Orr Rd. and Saulk Trail, $600,000. CD 10/10/56.

▲ **Mich., Detroit**—Bd. Supervs. Wayne Co., City-County Bldg., Zone 26, trunk sewers in all unserved areas Nankin Twp. $3,000,000. Hubbell, Roth & Clark, 954 North Hunter Blvd., Birmingham, engrs. CD 12/25/56.

▲ **Ore., Klamath Falls**—City, City Hall, sewers, $1,376,000; plant $343,115. Cornell, Howland, Hayes & Merryfield, 1600 Western Ave., Corvalis, consult. engrs. CD 2/1/56.

▲ **Pa., Bangor**—Borough, Borough Hall, Ralph Erdman, council pres., sanitary sewerage sys. and treatment plant, Proj. No. PA 36-P-3082. $1,466,200.

▲ **Ont., Brantford**—Ontario Water Resources Com., East Block, Parliament Bldgs., Toronto, 12,500,000 g.p.d. sewage treatment plant. $2,910,000.

BRIDGES

▲ **IDAHO**—State Hy. Dpt., Boise,
Bannock Co.—4-lane underpass (railway) 0.3 mi. N.S. 30 N, $500,000.
Bingham Co.—railway underpass, grade, structures, base, 6.8 mi. U.S. 91-191, $1,434,000.
3 highway separations, railway overpass, 1 mi. U. S. 91-191, $509,000.
Cassia Co.—7 major structures .2 mi. U. S. 30 N, $764,000.
Jerome Co.—major structure, State Hy. 25, $957,000.
Lewis Co.—2 railroad underpasses, U. S. 95, $200,000.
Minidoka and Cassia Counties—1,000 ft. Twin Bridges 0.2 mi. U. S. 30 N, $825,000.
Minidoka Co.—5 major structures 0.4 mi. U. S. 30 N, $1,501,000.
Owyhee Co.—520 ft. bridge and approach, bit. surf. treatment 0.5 mi. State Hy. 51, $282,000.
Payette Co.—grade, 4-lane overpass, plantmix 1.5 mi. State Hy. 52, $907,000.
twin bridges, Snake River, 0.1 mi. U. S. 30, $780,000.

Continued on page 171

CONTRACTOR SPEEDS CONCRETE POUR ON SEWAGE PUMPING STATION IN BALTIMORE, while a MORETRENCH WELLPOINT SYSTEM CONTROLS 18′ OF WATER IN mixed sand and clay layers overlying hard red clay . . . . . .

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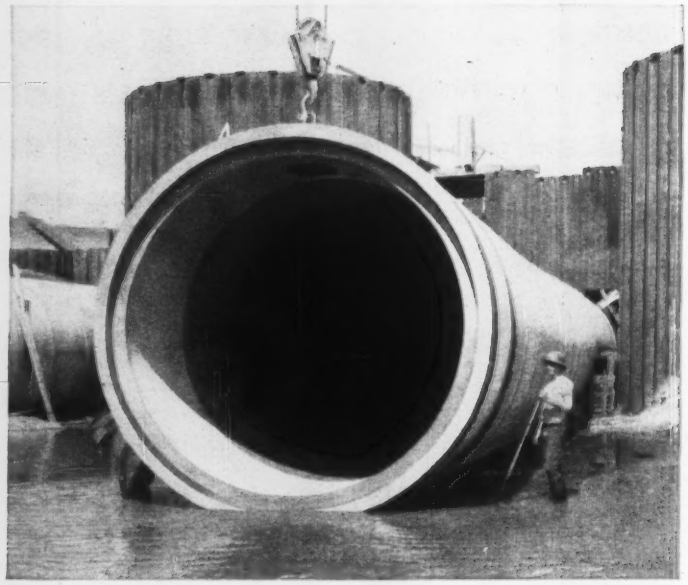

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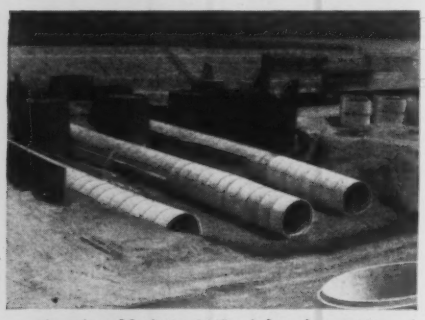

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GENERAL OFFICES:
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101 EAST ONTARIO STREET, CHICAGO 11, ILLINOIS, PHONE: WHITEHALL 4-5600

(Continued from page 168)

6 major structures, U. S. 30, $715,000.
10 major structures, U. S. 30, $880,000.
Power Co.—major structures, bit. surf. treatment 1.0 mi. U. S. 30 N, $500,000.
Washington Co.—4-lane underpass (railway), grade, plantmix 1.7 mi. U. S. 30 N, $850,000.
▲ **IDAHO**—State Hy. Dpt., Boise,
Benewah Co.—roadmix 1.3 mi. N. S. 95 A, 2-lane overpass (railway) approaches, $290,000.
Bonner Co.—2 railroad separations, grade, bit. surf. treatment 2.9 mi. N. S. 95, $1,615,000.
reconstr. railroad overpass, relocate approaches, 0.5 mi. N. S. 2-95, $300,000.
Bonneville Co.—major structures, N. S. 91, $1,740,000.
Boundary Co.—railway underpass 1 mi. N. S. 95, $600,000.
Kootenai Co.—8 structures 4.8 mi. N. S. 10, $1,200,000.
Shoshone Co.—3 structures 5.2 mi. N. S. 10, $800,000.
▲ **Ont., Leaside**—Town of Leaside, 235 McRae St., Leaside (Toronto suburb), high level bridge, Don Mills Rd., Thorncliffe Park, $1,000,000. T. O. Lazarides & Assocs. Ltd., 209 Davenport Rd., Toronto, consult. engrs.

STREETS AND ROADS

▲ **IDAHO**—State Hy. Dpt., Boise,
Ada Co.—curbs and gutters, channel, plant mix, 1 mi. U.S. 30, $500,000.
grade, channel, plantmix, 4-lane, 5.8 mi. U.S. 30, $1,250,000.
grade, plantmix, 6.3 mi. State Hy. 44, Star to Eagle, $1,204,000.
surf., plantmix 14 mi. State Hy. 21, $710,000.
grade, plantmix 8.9 mi. State Hy. 16, $949,000.
Bannock Co.—grade, major structure, base, 1.7 mi. U.S. 91-191, $242,000.
grade, major structure, base, 0.5 mi. U.S. 91-191, $154,000.
grade, major structure, base 5.9 mi. U.S. 91-191, $873,000.
Bear Lake Co.—grade, curb and gutters, plantmix 4-lane 0.3 mi. U.S. 89, city of Montpelier, $147,000.
Bingham Co.—recondition, surf., bit. surf. treatment 43.2 mi. State Hy. 38, $430,000.
wid'n. and pave shoulders 10.6 mi. U.S. 26-91, $137,000
grade, base, 3.5 mi. U.S. 91-191, $1,152,000.
grade, curb and gutters, lights, plantmix, 4-lane, Blackfoot streets 2.1 mi. U.S. 91-191, $700,000.
surf., plantmix 16.5 mi. U.S. 91-191, $1,172,000.
Butte Co.—curbs and gutters, bit. surf. treatment, 1.8 mi. U.S. 20-26-93A, $286,000.
Canyon Co.—grade, roadmix 5 mi. State Hy. 72, $75,000.
reconstruct 2-lane 6.7 mi. State Hy. 45, $670,000.
reconstruct 4-lane hy. 0.7 mi. State Hy. 45, $160,000.
grade, curbs and gutters, plantmix 2.6 mi. U.S. 30, Caldwell street, city of Caldwell, $500,000.
grade, surf., plantmix 9.3 mi. U.S. 20-26, $1,200,000.
Caribou Co.—grade, surf., bit. surf. treatment, 2.0 mi. U.S. 30 N, $150,000.
Cassia Co.—recondition, surf., bit. surf. treatment 7.2 mi. U.S. 30, $347,000.
relocation, bit. surf. treatment 5.5 mi. State Hy. 77, $323,000.
curbs and gutters, plantmix 4-lane 1.5 mi. State Hy. 27, $160,000.
surf. and plantmix 29.4 mi. U.S. 30 N, $3,560,000.
grade, minor structure, 21.3 mi. Raft River bridge, U.S. 30 N, $2,304,000.
Clearwater Co.—grade, plantmix 9 mi. State Hy. 7, $382,000.
Elmore Co.—recondition, curbs and gutters, surf., plantmix 3.7 mi. U.S. 30, $355,000.
grade, structures, plantmix, 4-lane 8.2 mi. U.S. 30, $2,000,000
Franklin Co.—grade, bit. surf. treatment 5.8 mi. State Hy. 34, $432,000.
grade, curb and gutters, plantmix, 2-lane 3.8 mi. U.S. 91, $280,000.
curb and gutter, grade, plantmix, 4-lane, 1 mi. State Hy. 86, Preston streets, city of Preston, $145,000.
Idaho Co.—relocate, grade 13.5 mi. U.S. 95, $1,462,000.
plantmix 12 mi. U.S. 95, $396,000.
grade bit. surf. treatment 5.5 mi. U.S. 95, $1,360,000.
Jerome Co.—surf. and plantmix 7.5 mi. State Hy. 25, $990,000.
grade and minor structures, 7.5 mi. State Hy. 25, $1,680,000.
Latah Co.—grade, surf. 5.5 mi. State Hy. 7, $399,000.
relocate, grade, plantmix 2.2 mi. State Hy. 7, $268,000.
plantmix 20.3 mi. U.S. 95 A, $383,000.
Minidoka Co.—grade, curb and gutters, plantmix 4-lane 1.5 mi. U.S. 30 N, Rupert Streets, city of Rupert, $320,000.
reconstruct, surf., bit. surf. treatment 12 mi. State Hy. 25, $545,000.
grade, minor structures 8.1 mi. U.S. 30 N, $1,516,000.
Payette Co.—surf. and plantmix 3.3 mi. $220,000.
grade, minor structures 3.3 mi., $145,000.
surf., plantmix 10.8 mi. U.S. 30, $1,105,000.
grade, minor structures, 10.8 mi. U.S. 30, $2,825,000.
surf., plantmix 10.3 mi. U.S. 30, $1,100,000.
grade, structures, plantmix 3.1 mi. U.S. 30, $1,800,000.
grade, minor structures 10.3 mi. U.S. 30, $2,470,000.
Power Co.—grade, bit. surf. treatment 6.8 mi. State Hy. 35, $495,000.
grade, structures, bit. surf. treatment 8.9 mi. U.S. 30 N, $2,804,000.
Twin Falls Co.—plantmix 12.3 mi. U.S. 93, $248,000.
grade, bit. surf. treatment 3.1 mi. U.S. 93, $323,000.
grade, curb and gutters, plantmix 4-lane 5 mi. U.S. 30, $800,000.
grade, curb and gutters, plantmix 4-lane 2 mi. U.S. 30, $500,000.
Washington Co.—grade, 2 bridges, plantmix, 2-lane, 4-lane 2 mi. U.S. 95, $365,000.
grade, 2 bridges, plantmix 2.1 mi. U.S. 95, $300,000.
▲ **IDAHO**—State Hy. Dpt., Boise,
Benewah Co.—plantmix 8 mi. N. S. 95 A, $140,000.
Bonneville Co.—grade, minor structures, base 9.7 mi. N. S. 91, $1,574,000.
surf., plantmix 9.7 mi. N. S. 91, $1,240,000.
grade, structure, plantmix 6.4 mi. N. S. 91, $2,450,000.
curbs, gutters, plantmix, 4-lane 0.3 mi. N. S. 191, $98,000.
grade, bit. surf. treatment 4 mi. State Hy. 49, $300,000.
grade, curb, gutters, plantmix 4-lane 1.2 mi. N. S. 91-191, $300,000.
Butte Co.—recondition, grade, surf. plantmix 15.2 mi. State Hy. 28, $747,000.
Clark Co.—grade, surf., plantmix, 2-lane 2.7 mi. N. S. 91, $600,000.
grade, bit. surf. treatment 14.9 mi. State Hy. 22, $248,000.
Fremont Co.—plantmix and channel 4.7 mi. N. S. 191, $185,000.
Kootenai Co.—grade, structures, plantmix, 4-lane 3.8 mi. N. S. 10, $2,000,000.
grade, drain, 4 structures 4.8 mi. N. S. 10, $2,400,000.
surf., plantmix 4.8 mi. N. S. 10, $470,000.
Shoshone Co.—grade, hydr. fill, 4-lane 3 mi. N. S. 10, $160,000.
grade, drain, structures, plantmix 4-lane 3 mi. N. S. 10, $3,540,000.
grade, surf., plantmix 5.2 mi. N. S. 10, $5,200,000.
Teton Co.—grade, curb and gutters, 3 bridges, roadmix 5.7 mi. State Hy. 33, $574,000.
▲ **NEW YORK**—State Dpt. P. Wks., Bureau Contracts & Accounts, The Gov. Alfred E. Smith State Office Bldg., Albany,
Monroe Co.—reconstr. 1.1 mi. Rte. 31, incl. bridge over Erie Barge Canal and relocation 1,500 ft. section nearby County Line Rd. to meet Rte. 31's new alignment, FAI Proj. $350,000.
Steuben Co.—constr. 2 mi. four-lane divided section Hornell's North-South Arterial Highway beginning at south city line and proceeding northerly on new location, parallel to and east of Canistee St. to new grade separation structure over Erie R.R. about 400 ft. east of existing underpass, then northwesterly on new location to point near Union Park and then northerly to and west of Seneca St. to north city line, FAI Proj. $1,000,000. CD 4/30.

EARTHWORK, WATERWAYS

▲ **Ore., Eugene**—Water & Electric Bd., City Hall, 56,250 KW-Carmen-Smith Hydro-electric project on Upper McKenzie River. $18,000,000. Applied to FCC for permit, if granted will abandon Beaver Marsh project. Cornell, Howland, Hayes & Merryfield, 1600 Western Ave., Corvallis, consult. engrs. CD 10/11/54.

AIRPORTS

▲ **O., Columbus**—AIRPORT IMPRVS.—City, City Hall, East-West Runway at Port Columbus Airport, $2,100,000. CD 9/19/56.
▲† **O., Oberlin**—TRAFFIC CONTROL CENTER—Civil Aeronautics Auth., 16th and Constitution Ave. N. W., Wash., D. C., air route traffic center on 15 acre site on Lorain St. $1,000,000. Plans being done in Washington, and will be ready April 1. Bids will be handled by General Services Admin., Chicago Office.

LATIN AMERICA

▲ **Brazil, San Paulo**—PLANT—Jacuzzi Brothers, Inc., Richmond, Calif. and 2515 Texas, Houston, Tex., U. S. A., plans manufacturing plant. $1,000,000.
▲ **Venezuela**—REFINERY—Socony Mobil de Venezuela, sub. Socony Mobil Oil Co., 150 E. 42nd St., New York, N. Y., U. S. A., plans 40,000 bbl. per day refinery at El Palito, near Puerto Cabello. $28,000,000.

AMERICANS ABROAD

▲ **Spain, Aviles**—APARTMENT—Norman K. Winston, 22 West 48th St., New York, N. Y., U. S. A. and Don Domingo Lopez Alonso, plans by Don Jacobo Romero Fernandez, c/o owner, 6 to 14 story co-operative apartment, El Barrio de LaLuz (Community of Light) $45,000,000.

PUBLIC BUILDINGS

▲ **Calif., Azusa**—SCHOOL—Azusa City School Dist., 340 W. 5 St., $1,240,000 bond election May 20, school, CD 8/16/56.
▲ **Calif., Downey**—SCHOOL—Alameda Unified School Dist., 8613 E. Alameda St., $1,292,000 bond election May 20, for school.
▲ **Calif., Grossmont**—HOSPITAL—Grossmont Hospital Dist., N. La Mesa, Grossmont, plans by Pereira & Luckman, 9220 Sunset Blvd., Los Angeles, addns. to Grossmont Hospital. $1,800,000. Bonds voted. CD 5/17.
▲ **Calif., Lancaster**—SCHOOL—Antelope Valley, Unified School Dist., 1000 Division St., $12,500,000 bond election Apr. 22, school. CD 7/10/56.
▲ **Calif., Los Angeles**—SCHOOLS—Bd. Educ., 1425 S. San Pedro St., $158,500,000 bond election June 3 for elementary schools $51,000,000; Junior and Senior High Schools $81,500,000; Junior Colleges $26,000,000. CD 4/8/55.
▲ **Calif., Los Banos**—SCHOOL—Los Banos Union H. S. Dist., c/o Supt. P.O. Box 112, defeated bonds Feb. 25, high school. $1,500,000, Donald Francis Haines, 2015 Pacific Ave., Stockton, archt. CD 1/23.
▲ **Calif., Ontario**—SCHOOL—Chaffey Union High School Dist., 1245 N. Euclid Ave., plans by Eugene Weldon Fickes, Jr. & J. Dewey Harnish, 222 E. B. St.,

(Continued on page 174)

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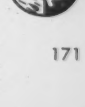

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(Continued from page 171)

six 1 story, 161,000 sq. ft. grouted brick Monte Vista High School. $2,300,000. CD 2/14/57.

▲ **Calif., Palos Verdes**—SCHOOL—Palos Verdes School Dist., $1,500,000 bond election May 20, school, CD 7/22.

▲ **Conn., New Britain**—SCHOOL—Town, Bd. Educ., 27 Hillside Place, plans by Hollis W. Kincaid, 993 Farmington Ave., West Hartford, 1 story, semi-fireproof, Western Elementary School, Slater Rd., $1,060,000. John P. Legnos Assocs., 30 Gillett St., Hartford, consult. engrs. A. B. Onderdonk, 119 New London Turnpike, Glastonbury, struct. engr. CD 12/4.

▲ **Conn., West Hartford**—SCHOOL—Town, School Bldg. Comn., 51 Memorial Rd., plans by Russell & Gibson & Assocs., 1009 Farmington Ave., North-East Elementary School, Simsbury Rd. area. $1,250,000. CD 4/17/56.

▲ **Ill., Homewood**—SCHOOL—School Dist. 233, 1955 Ridge Rd., plans by Perkins & Will, 309 W. Jackson Blvd., Chicago, Flossmoor Community High School, bounded by Kedzie, Flossmoor Rd., Brumley and Governors Hy. $2,100,000.

▲ **Ind., Lebanon**—SCHOOL—Lebanon School Bldg. Corp. plans by McGuire, Shook & Assocs., Fletcher Trust Bldg., Indianapolis, high school addn. $1,310,000.

▲ **Iowa, Dubuque**—SCHOOLS—Bd. Educ., M. R. Clark, supt. Schools, plans by Durant & Bergquist, 666 Loras St., addns. to schools, $1,000,000.

▲† **Me., Topsham**—HOUSING—U. S. Eng., 150 Causeway St., Boston 14, Mass., plans by Kelly & Gruzen, 80 Fifth Ave., New York 3, N. Y., 177 unit Capehart housing at Topsham Air Force Base. $1,700,000.

▲ **Mass., Amherst**—INFIRMARY—Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Contr. U 58-4, infirmary for University of Mass. $1,080,000. Constr. 1958.

▲ **Mich., Croswell**—SCHOOLS—Bd. Educ., Croswell-Lexington School Dist., Croswell, defeated bonds Feb. 18, high school and 4-room grade school. $1,350,000. CD 1/30.

▲ **Mich., Grand Haven**—GENERATING STATION—City, Bd. P. Wks., Grand Haven, steam electric generating station, on Island in Grand River. $4,800,000.

▲ **Mich., Kalamazoo**—NATURAL SCIENCE—State, A. N. Langius, dir. State Bldg. Dpt., Lewis Cass Bldg., Lansing, plans by Louis C. Kingscott & Assoc., 511 Monroe St., natural science bldg., Western Michigan College. $2,000,000. CD 9/5/56.

▲ **Mo., Eureka**—SCHOOL—School Dist. R-6, Bd. Educ., Morgan Selvidgo, supt. Schools, Hy. No. 66, defeated $1,210,000 bonds Feb. 25, school bldg. and imprvt. program. CD 2/18.

▲ **N. J., Newark**—SCHOOL—City, City Hall, constr. Garfield Elementary School addn., $1,500,000; South Eighth Street Elementary School addn., $1,500,000.

▲ **N. J., Paramus**—SCHOOL—Bd. Educ. Boro of Paramus, plans by Arthur Rigolo, Rte. 46 and Grove St., Clifton, high school, $2,000,000.

▲ **N. Y., Brooklyn**—HOUSES—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by Dominick Salvati & Sons, 26 Court St. Zone 2, Proj. NYS-47, Lafayette Houses, Lafayette, Classon, DeKalb and Franklin Aves. $13,000,000.

▲ **N. Y., Brooklyn**—HOUSES—New York City Housing Auth., 299 Broadway, New York Zone 7, Proj. NYS-46, Lindsay Park Houses, McKibbin St., Lorimer St., Montrose and Manhattan Aves. $13,500,000.

▲ **N. Y., Centereach**—SCHOOL—Centereach-Selden Central School Dist. No. 11 plans by Frederic P. Wiedersum Assocs., 65 Roosevelt Ave., Valley Stream, high school, Marshall Drive. $2,000,000.

▲ **N. Y., Clarence**—SCHOOL—Clarence Bd. Educ., Main and Gunnvale Rd., voted bonds Feb. 15, elementary school, Boncrest Rd. $1,100,000. Kideney, Smith & Fitzgerald, 220 Delaware Ave., Buffalo, archts. CD 1/22.

▲ **N. Y., New Brighton**—HOUSES—New York City Housing Auth., 299 Broadway, New York, Zone 7, Proj. NYS-39, Richmond Terrace Houses, Jersey St., Richmond Terrace, Cleveland St., and Crescent Ave., Richmond Boro. $6,000,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by Harry M. Prince, 101 Park Ave., Zone 17, Proj. No. 5-43, Andrew Jackson Homes, Park Ave., E. 158 St., Courtlandt Ave. and E. 156 St., Bronx Boro. $10,000,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, Proj. No. NYS-92, Gun Hill Road Houses, Gun Hill Rd., Bronxwood Ave., Barnes Ave. and Tilden St., Bronx Boro. $6,500,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by S. J. Kessler & Sons, 551 Fifth Ave., Zone 17, Proj. No. NYS-49 John Adams Houses, Westchester Ave., Union Ave. and E. 152 St., Bronx Boro. $13,500,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by Gustave W. Iser, 95 Madison Ave., Zone 16, Proj. NYS-50, Franklin D. Roosevelt Houses, First Ave., E. 2 St. to E. 6 Sts. and Avenue A, Manhattan Boro. $18,000,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by Pomerance & Breines, 33 W. 46 St., Zone 19, Proj. No. NYS-89, Woodrow Wilson Houses, E. 105 St. First Ave., E. 106 St. and F. D. R. Drive, Manhattan Boro. $6,000,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by Urbahn Brayton & Burrows, 654 Madison Ave., Zone 21, Proj. NYS-45, DeWitt Clinton Houses; Park Ave., E. 104 St. to E. 106 St., E. 108 St. to E. 110 St. and Lexington Ave., Manhattan Boro. $11,000,000.

▲ **N. Y., New York**—HOUSES—New York City Housing Auth., 299 Broadway, Zone 7, plans by Katz, Waisman, Blumenkranz, Stein, Weber, Architects Associated, 551 Fifth Ave., Zone 17, Proj. NYS-81, Alexander Hamilton Houses, W. 141 St., 8 Ave., W. 144 St. and 7 Ave. $15,000,000. CD 2/28/55.

▲ **N. Y., Silver Creek**—SCHOOL—Silver Creek Bd. Educ., Silver Creek, defeated bonds Feb. 26, high school. $2,328,000. Feit & Baschnagel, 250 Delaware Ave., Buffalo, Zone 2, archts. CD 2/13.

▲ **N. Y., Stapleton**—HOUSES—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by William F. R. Ballard, 123 E. 77 St., New York, Zone 21, Proj. No. NYS-88, Stapleton Houses, Hill, Warren, Gordon and Broad Sts. and Tompkins Ave., Richmond Boro. $10,500,000.

▲ **N. Y., West New Brighton**—HOUSES—New York City Housing Auth., 299 Broadway, New York, Zone 7, plans by Irwin Clavan, 350 Fifth Ave., New York, Zone 1, Proj. NYS-40, West Brighton Houses, Castleton Ave., Alaska St., Henderson Ave. and Campbell St., Richmond Boro. $7,000,000.

▲ **Ore., Corvallis**—MEN'S DORMITORY—Bd. Higher Educ., University of Oregon, Eugene, plans by Burns, Bear, McNeil & Schneider, 2940 S. E. Belmont St., Portland, 5 story men's dormitory, Oregon State College, $1,118,000. CD 2/10.

▲ **Ore., Corvallis** — PHYSICS-CHEMISTRY — State Bd. Higher Educ., University of Oregon, Eugene, second unit, Physics-Chemistry Bldg., Oregon State College. $2,287,352. CD 10/10/56.

▲ **Ore., Corvallis**—PHYSICS-CHEMISTRY, etc.—State Bd. Higher Educ., University of Oregon, Eugene, plans by Burns, Bear, McNeil & Schneider, 2940 S. E. Belmont St., Portland, first unit Physics-Chemistry Bldg., Oregon State College. $2,237,669. CD 2/13.

▲ **Ore., Portland**—MEDICAL RESEARCH—Bd. Higher Educ., University of Oregon, Eugene, plans by Burns, Bear, McNeil & Schneider, 2940 S. E. Belmont St., Portland, 9 story, 57 x 182 ft. Medical Research Bldg., University of Oregon Medical School. $2,500,000. CD 2/10.

▲ **Ore., Portland**—SCHOOL—School Dist. 1, 631 N. E. Clackamas St., plans by Stanton, Boles, Maguire & Church, Concord Bldg., high school, Southeast Dist. $5,000,000. Bids in May. CD 9/20/56.

▲† **Tex., Houston**—COURTHOUSE, etc.—General Services Admin., Wash. 25, D. C., 12-15 story, Fed. Courthouse and Office, Rusk, Brazos, Capitol and Smith Sts. $15,300,000. CD 4/10/56.

▲† **Wash., Moses Lake**—HOUSING—U. S. Eng., 4735 E. Marginal Way, Seattle, Zone 4, plans by McClure & Adkison, Realty Bldg., Spokane, 200 housing units

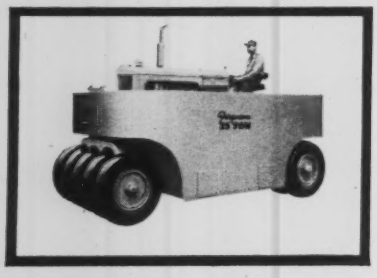
(Continued on page 176)

Ferguson

3 to 5 TON PORTABLE TANDEM ROLLER

COMBINATION CONSTRUCTION AND MAINTENANCE ROLLER

Air or water cooled engine. Wheels hydraulically controlled. Hydraulic steering. Two-speed transmission. Furnished also as tandem.



• 25-ton Self-propelled; also furnished in 10 and 12 ton sizes. Gasoline or diesel power.

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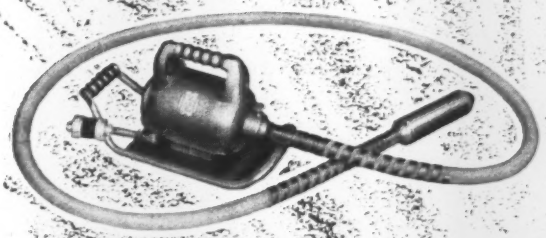
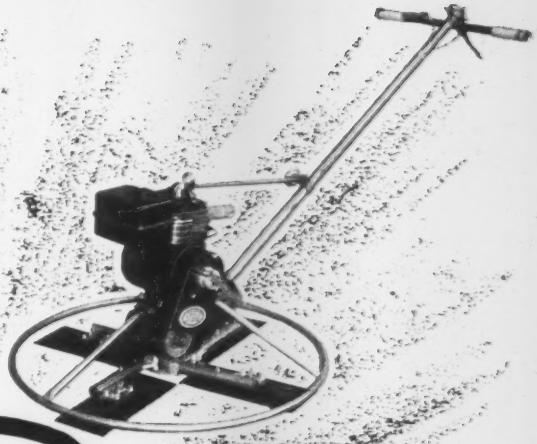


VIBRATORS



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Into each unit of STOW-built construction equipment goes years of research in the field, months of testing new designs on the job, plus 80 years of STOW engineering know-how. STOW maintains close contact with contractors, keeping abreast of their current problems . . . incorporating their needs into the STOW line of construction equipment.

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LENKER MFG. CO.
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(Predraining Problem)

GET THIS!
(Skilled Wellpoint Engineering)

From

GRIFFIN

WELLPOINT CORP.
881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.

(Continued from page 174)

at Larson Air Force Base under Capehart program, $3,000,000. Bids in Spring. CD 12/13.

▲ **Wash., Pullman**—CHEMISTRY, etc.—Washington State College, Pullman, plans by Jones, Lovegren, Helm & Jones, Republic Bldg., Seattle, Zone 1, 4 story, 66,000 sq. ft. bldg. for chemistry and agricultural chemistry, $3,500,000. Bids soon. CD 1/9.

▲ **Alta., Red Deer**—HOSPITAL—Red Deer Municipal Hospital Bd., Red Deer, hospital addn. and nurses' residence. $1,471,000.

▲ **Que., Montreal**—CIVIC CENTER—City, City Hall, plans by David & David, 7020 Cote des Neiges Rd., 2 and 3 story, bsmt. Civic Center, Bellechasse St. E. $1,750,000. Brouillet & Carmel, 3600 Barclay Ave., consult. engrs. Bids next month.

COMMERCIAL BUILDINGS

▲ **Ariz., Phoenix**—COURTHOUSE, etc.—General Services Admin., 18th and F Sts. N.W., Wash. 25, D. C., plans by Edward L. Varney Assocs., 221 E. Camelback Rd., and Lescher & Mahoney, Title & Trust Bldg., Phoenix, courthouse and federal office bldg. (lease-purchase proj.) $8,600,000. CD 7/22.

▲ **Ark., Helena**—POST OFFICE, etc.—General Services Admin., 18th and F Sts., Wash. D. C., plans by Edward F. Brueggeman and Elmer A. Stuck & Assocs., 217 E. Washington Ave., Jonesboro, constr. U. S. Post Office and Court House (lease-purchase proj.) $1,020,000. CD 11/21.

▲ **Calif., El Cajon**—DWELLINGS—Pepper Drive Estates, c/o Raymond Dean Cromwell & Assocs., archts., 919 S. Garfield Ave., Los Angeles, one hundred ten, 1012 sq. ft. frame, stucco dwellings. $1,100,000.

▲ **Calif., San Mateo** — ELDERLY PERSONS HOME — Presbyterian Church Synod of Calif., 228 McAllister St., San Francisco, home for elderly persons on 40 acre site in Portola Valley. $2,800,000.

▲ **Calif., Santa Ana**—DWELLINGS—Fairview Homes, 620 Vance St., 314 dwellings, Tracts 3355, 3356 on Fairview Ave., Center St., and Wilshire Ave., $3,000,000, Boyle Engineering Co., Spurgeon Bldg., consult. engrs.

▲ **Conn., Plainville**—HOUSING—Walter D. Sullivan, 192 Lincoln St., New Britain, 170 houses, Pinnacle Rock Farm, Cook St. $2,720,000.

▲ **Conn., Tarriffville**—HOUSING—I. R. Stitch Assocs., Inc., 611 New Park Ave., West Hartford, plans by Elroy Weber, 57 Pearl St., Springfield, Mass., 175 Houses "Simsbury Heights" second section, West Point Terrace, $2,835,000. Francis P. Molloy, 10 N. Main St., West Hartford, consult. engr.

▲ **Fla., Miami Beach**—APARTMENTS, etc.—Cole Corp., 940 Lincoln Rd., plans by Henry Hoauser & Assocs., 4011 Chase Ave., three 2 story 84 unit Apartments, with swimming pool, area-lower level parking garage, south side of Lincoln Rd. and Biscayne Bay, $1,000,000.

▲ **Fla., St. Petersburg**—HOTEL—Harold W. Reeves & Assocs., 1927 Brightwaters Blvd. N.E., hotel, in downtown location. $1,000,000.

▲ **Ill., Arlington Heights**—SHOPPING CENTER—Owner, c/o Woodworth-Calder, Inc., 7356 N. Cicero Ave., Lincolnwood, plans by Frank Polito, 7356 N. Cicero Ave., Lincolnwood, shopping center, motel, SE cor. Rand and Palatine Rds. near here. $2,000,000.

▲ **Ill., Chicago**—OFFICE—John Blair & Co., 415 Madison Ave., New York, N. Y., 10 story office bldg., 643 N. Michigan Ave. $4,500,000.

▲ **Ill., Chicago**—DORMITORY—University of Chicago, 5801 S. Ellis Ave., plans by Harry M. Weese, 104 S. Michigan Ave., 10 story, bsmnt., brick, stone, men's dormitory bldg., 55th and University Ave. SW corner. $2,400,000.

▲ **Ill., Deerfield**—SHOPPING CENTER—Owner, c/o Landau & Heyman, 110 S. Dearborn St., Chicago, plans by Sidney C. Finck, 343 S. Dearborn St., Chicago, 21 unit Deerfield Commons Shopping Center, 8-acre tract at Waukegan Rd. and Deerfield Rd. $1,500,000.

▲ **Ill., LaGrance**—HOSPITAL—Community Memorial General Hospital, 5101 Willow Springs, 1 story addn. to present facilities and new wing at left. $1,800,000.

▲ **Ind., South Bend**—LIBRARY, etc.—University of Notre Dame, Rev. John J. Cavanaugh, 10 year constr. progarm, incl. library, $5,000,000; 2 graduate residence halls, $2,250,000; faculty hall, $1,500,000; maintenance center, $600,000; engineering commerce and law addns., $500,000; field housing, $4,000,000 and auditorium, $3,500,000.

▲ **Mass., Cambridge**—DORMITORY—Harvard College, Cambridge, plans by Shepley, Bulfinch, Richardson & Abbott, 1 Court St., Boston, dormitory addn., Leverett House. $1,500,000. CD 2/21.

▲ **Minn., Bemidji**—FEDERAL OFFICE—General Services Admin., 19 and F Sts. N.W., Wash. 25, D. C., plans by Jyring & Whiteman, Hibbing, Minn., federal office bldg. (lease-purchase proj.). $1,200,000. CD 10/9/56.

▲ **N. J., Allendale**—HOUSES—S. T. Van Houten & Sons, 24 W. Allendale Ave., 93 houses, Hillside Ave. at Crestwood Lake. $3,250,000.

▲ **N. J., Hoboken**—POSTAL TERMINAL—General Services Admin., 18th and F St., Wash. D. C., rail-truck postal terminal at north end of D.L. & W. R.R. terminal, $1,000,000.

▲ **N. J., Ringwood**—COUNTRY CLUB—Ringwood Conutry Club, 1780 Broadway, New York, N. Y., and 948 Teaneck Rd., Teaneck, plans by Carl K. Loven, 119 Rock Rd., Glen Rock, country club, 600 acres on Rte. 17, $1,000,000.

▲ **N. J., Summit**—HOUSES—Horton Corp., 1021 Stuyvesant Ave., Union, 77 houses, Baltusrol Rd. $1,700,000.

▲ **N. Y., New York**—LIBRARY—General Theological Seminary, 175 Ninth Ave., plans by O'Connor & Kilham, 101 Park Ave., Zone 17, library bldg., Ninth Ave. and 20 St. $1,500,000.

▲ **N. Y., New York**—OFFICE—David Rose & Assocs., Inc., 340 W. 58 St., Zone 19, plans by Emery Roth & Sons, 575 Madison Ave., Zone 22, converting 17 story apartment at 280-290 Park Ave., Southwest corner of 49 St. into 22 story office bldg. $3,896,000.

▲ **O., Cincinnati**—MOTEL Rudy Reinhold, 1010 Gilbert Ave., plans by Al. J. Martina, 2167 Florence Ave., 5 story, 180,000 sq. ft. glass front motel, Reading Rd. $3,000,000. E. A. Sobolewski, 2340 Laredo, consult. engr. Constr. early summer. CD 8/22.

▲ **O., Cleveland**—CEI BLDG., etc.—Trebor Realty Co., 75 Public Square, Zone 13, plans by Charles Bacon, Rowley & Assocs., Keith Bldg., Zone 15, remodeling of CEI Bldg., Public Square. $2,000,000.

▲ **O., Tiffin**—DORMITORY, etc.—Heidelberg College, Tiffin, dormitory, laboratory-classroom bldg., health center, track and athletic field. $3,000,000. (10-year program). CD 4/4/45.

▲ **O., Toledo**—SHOPPING CENTER ADDN.—Westgate Village Shopping Center, Inc., c/o Bernard Greenbaum, 59 E. Van Buren, Chicago, Ill., 160,000 sq. ft. Westgate Village Shopping Center Addn., north side of Central Ave., with bypass road to link Secor and Center Aves. $1,500,000.

▲ **O., Warrensville**—HOME FOR THE AGED—Little Sisters of the Poor, 2507 E. 22nd St., Cleveland, Zone 15, plans by Stickle & Assocs., 2422 Prospect Ave., Cleveland, Zone 15, 3 story Home for the Aged, Richmond Rd., south of Harvard Ave., Approx. $2,000,000. Bids in about 3 months.

▲ **Okla., Oklahoma City**—SHOPPING CENTER—Ben Wileman, 2924 Paseo, plans by Sorey, Hill & Sorey, 809 N.W. 36th St., 480,000 sq. ft. Shopping Center, N. Pennsylvania and the Expressway. $8,000,000.

▲ **Pa., Gettysburg**—STUDENT UNION—Gettysburg College, Gettysburg, student union bldg., with swimming pool, $1,120,000.

▲ **Tex., Arlington-Grand Prairie**—BOWLING CENTER—Great South West Bowling Lanes, Inc., c/o Amon G. Carter & Assocs., 400 W. 7th St., Fort Worth, plans by A. B. Swank, 2611 Cedar Springs, Dallas, bowling center. $1,000,000. CD 7/26.

▲ **Tex., Dallas**—HEADQUARTERS—Hartford Fire Group, c/o Trammell Crow, 425 S. Field St., plans by Harold A. Berry, 423 S. Field St., 14 story, brick, marble, Hartford Headquarters Bldg., Bryan and St. Paul Sts. $5,000,000. CD 3/6.

▲ **Tex., Houston**—HOTEL—DeGeorge Estate, c/o Michael J. DeGeorge, Milby Hotel, Travis St., plans by Chas. S. Chan, 403 Woodard St., hotel, Fannin and McKinney Sts. $5,500,000. CD 12/22/54.

▲ **Wis., La Crosse**—HOSPITAL—St. Francis Hospital of the Franciscan Sisters, 709 S. 10 St., plans by Maquolo & Quick, 4908 Delmar Blvd., St. Louis, Mo., hospital addns. $3,300,000.

▲ **Ont., Toronto**—HOME FOR AGED—House of Providence, (Sisters of St. Joseph) 65 Power St., Scarborough, Toronto suburb, plans by Brennan & Whale, 1221 Bay St., 5 story, rein.-con. slab, brick and glass, Elderly Persons Home, Warden Ave. at St. Clair Ave. $6,000,000. C. D. Carruthers & Wallace, 92 Yorkville Ave., consult. engrs.

INDUSTRIAL BUILDINGS

▲ **Ala., Irondale**—TV DISTRICT CENTER—General Electric Co., 1 River Rd., Schenectady, N. Y., plans by Warren, Knight & Davis, Protective Life Bldg., Birmingham, 1 story, 70,000 sq. ft. brick, concrete TV District Center in Irondale office park area to serve as major applicance. $1,000,000.

▲ **Mass., Wayland**—PLANT—Raytheon Mfg. Co., Foundry Ave., Waltham, 2 story, 75,000 sq. ft. masonry plant addn., Old Sudbury Rd. $1,000,000. Vappi, Symmes & Maini, 240 Sidney St., Cambridge, engrs. CD 2/19/54.

▲ **Mich., Detroit**—TRUCK TERMINAL—Commercial Carriers, Inc., Rigby Leighton, exec. vice-pres., 3399 McNichols East, 200 capacity trucks per day, truck terminal, Inkster and Beverly. $1,000,000.

▲ **Wyo., Atlantic City**—PLANT—Columbia-Geneva Steel Co., Russ Bldg., San Francisco, Calif., taconite ore-processing plant near here. $16,000,000. Bechtel Corp., 220 Bush St., San Francisco, Calif., consult. engrs. CD 11/22.

UNCLASSIFIED

▲ **Mo., St. Louis**—PLANETARIUM—City, Frank Kriz, pres. Bd. P. Service, 304 City Hall, 12 Blvd. and Market St., Zone 3, plans by Hellmuth, Obata & Kassabaum, 315 N. 10 St., Zone 1, planetarium. $1,000,000. CD 5/31/55.

▲ **Texas**—PLANT, etc.—El Paso Natural Gas Co., El Paso Natural Gas Bldg., El Paso, dehydration plant. $2,050,000; 68 mi. gas pipe line, $2,040,000; both between Fort Stockton and Crane, Pecos and Crane Counties. CD 12/31/56.

▲ **Tex., Houston**—TRANSPORTATION CENTER—City, constr. Central Transportation Center. $1,000,000. Eugene Maier, co owners, traffic engr.

(Proposal Advertisement see pp. 188 to 190)

You get *ONE EXTRA PAYLOAD in every eight!

Now! Anthony Frameless Dump Trailer units are available in steel (shown) or aluminum for still greater payload potential. Single or Tandem Axle models in lengths up to 24 ft.

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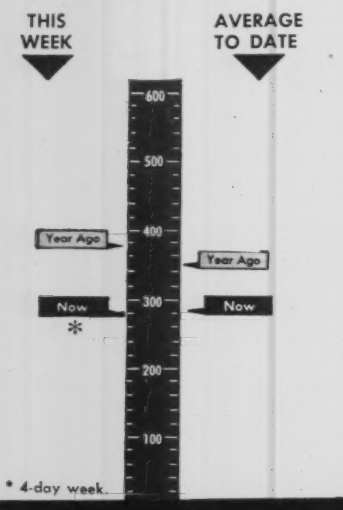
Construction Scoreboard

ACTIVITY THIS WEEK

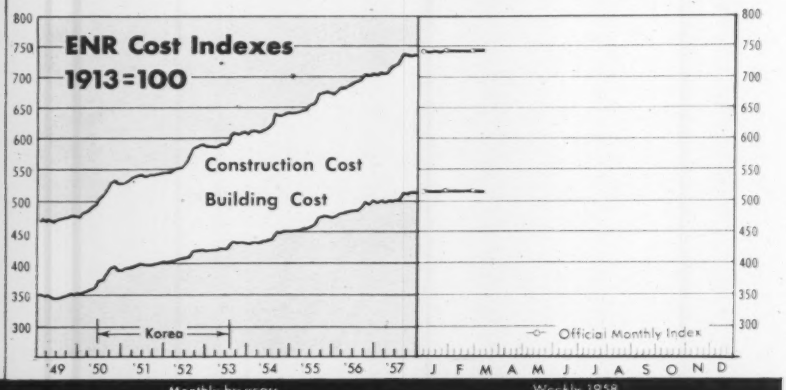
Contract Awards
Millions of Dollars



COST INDEXES AS OF NOW

ENR INDEXES (1913=100), 20-cities' average	Week of Mar. 13 1958	% Change from Feb. 13 1958	% Change from Mar. 14 1957
Construction Cost	744.31	+0.07	+5.0
Building Cost	515.99	+0.04	+3.0

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518



AMOUNT OF CONTRACTS LET

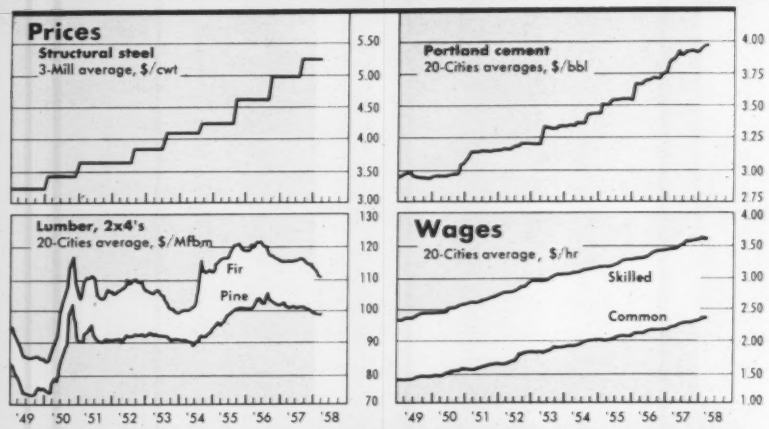
By Ownership	This Week	Cum. 12 wks 1958	Chge '57-'58
	millions		%
All Heavy Constr.	$278.3*	$3,390.1	−19
Private	132.3	1,555.8	−23
Public	146.0	1,834.3	−16
State & Municipal	113.4	1,464.9	−7
Federal	32.6	369.4	−41
By Type of Work			
Public			
Waterworks	1.7	46.4	−41
Sewerage	8.2	128.9	+46
Bridges†	2.6	91.8	−42
Highways	43.9	531.3	−16
Earthwork, Waterways	4.3	146.4	−52
Buildings, Excl. Housing	61.6	513.5	+3
Housing	8.6	255.9	+86
Unclassified	15.1	120.0	−59
Private			
Mass Housing	64.6	537.8	−17
Commercial	38.0	411.5	+6
Industrial	27.1	495.5	−40
Unclassified	2.6	111.1	−29

* 4-day week.
† Includes private bridges.

NOTE: Minimum size projects included are: Waterworks and waterways, $44,000; other public works, $73,000; industrial buildings, $93,000; other buildings, $344,000.

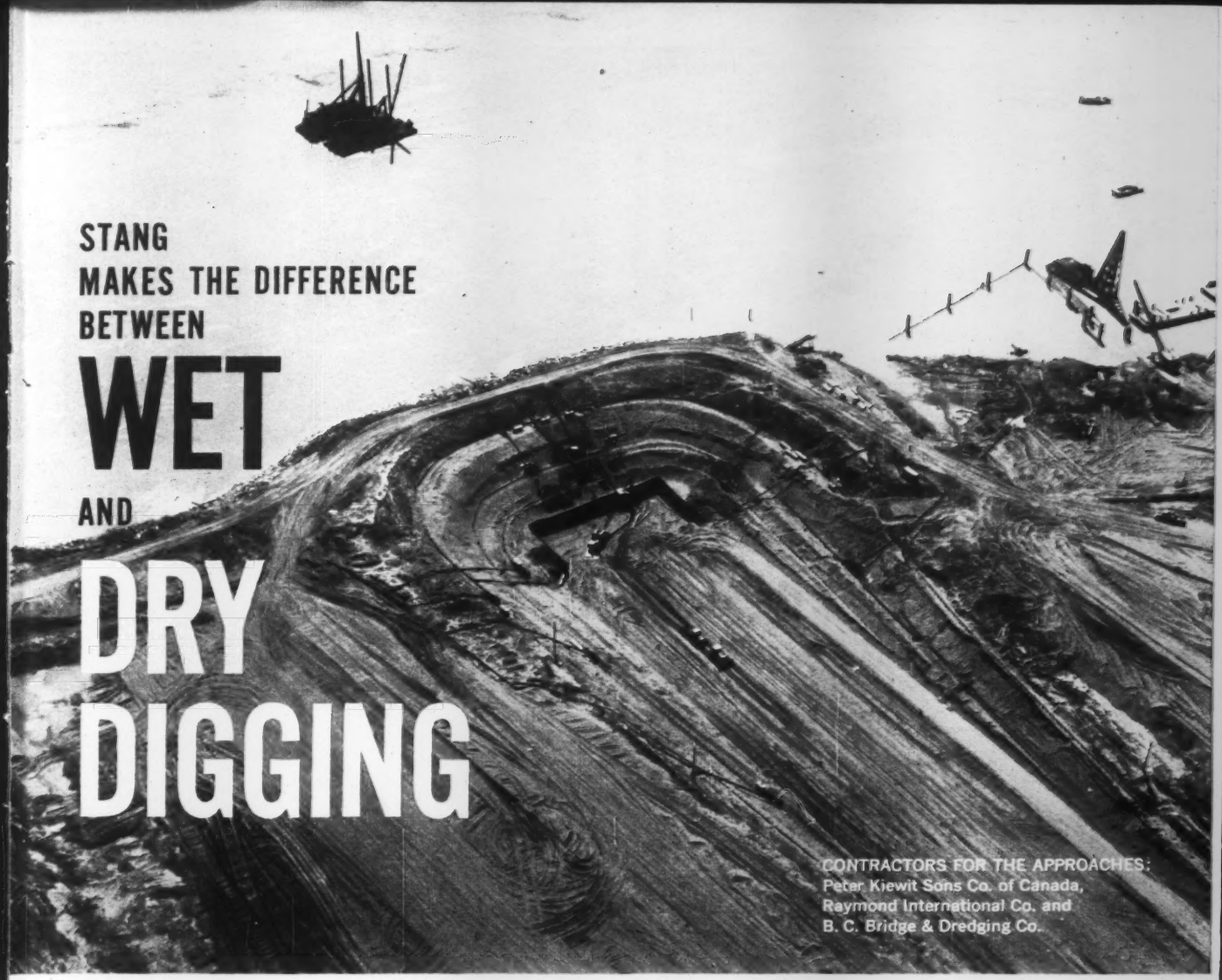
NEW CAPITAL FOR CONSTRUCTION

	Week of Mar. 13	Cum. 11 wks 1958	Chge '57-'58
	millions		%
Corporate Securities	$145.2	$1,226.6	−7
State and Municipal:			
All Except Housing	133.7	1,682.7	+45
Housing	...	1.0	−98
Federal Loans	...	45.7	+115
Federal Aid	...	...	...
Total Nonfederal	$278.9	$2,956.0	+16
Federal Appropriations:			
Projects in U. S.	...	$520.0	...
Outside U. S.	...	...	...
Total New Capital	$278.9	$3,476.0	+37



ENR COST INDEXES IN 22 CITIES, 1913 = 100

City	Construction Cost Mar. 1958	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Mar. 1958	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	558	0	+6.7	456	0	+3.1
Baltimore	672	+0.3	+4.7	523	+0.4	+4.8
Birmingham	593	0	+6.8	477	0	+4.3
Boston	764	+0.1	+2.7	522	+0.1	+3.0
Chicago	835	0	+5.8	527	0	+4.4
Cincinnati	745	0	+4.9	501	0	+3.1
Cleveland	847	−0.3	+3.2	542	−0.4	+0.7
Dallas	547	0	+4.2	451	0	+2.7
Denver	725	+2.0	+4.0	524	+0.2	+0.1
Detroit	852	+0.1	+5.3	545	+0.1	+3.4
Kansas City	742	0	+3.7	517	0	+2.3
Los Angeles	773	0	+5.7	507	0	+2.8
Minneapolis	803	0	+5.9	537	0	+2.0
New Orleans	588	0	+4.3	478	0	+3.2
New York	910	0	+6.8	593	0	+2.7
Philadelphia	775	0	+3.5	561	0	+0.9
Pittsburgh	804	0	+5.5	569	0	+5.2
St. Louis	814	0	+7.0	552	+0.7	+4.3
San Francisco	758	0	+5.2	503	0	+3.7
Seattle	785	0	+5.3	466	0	+3.1
U. S.—20 Cities' average	744	+0.08	+5.0	516	+0.06	+2.9
Montreal	584	0	+4.3	446	0	+2.1
Toronto	607	−0.3	+1.8	470	−0.3	+1.8



Deas Island Tunnel approaches DUG IN THE DRY—thanks to Stang dewatering

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Plant, Equipment Spending in a Decline

SEC-Commerce agencies see 13.2% drop this year, but equipment cuts may be more than for construction

There is bad news for construction in the table below. Manufacturers and commercial businesses plan to spend $5 billion less on new plant and equipment this year than last.

The report of the Securities and Exchange Commission and the Commerce Department shows that industry plans to spend only $32 billion this year as against $37 billion in 1957 for new plant and equipment. The outlook isn't lightened by later information. Reporting companies have been writing in to tell government statisticians that they have cut their spending plans even more since they filled out the survey questionnaire that supplied the data for the 1958 forecast.

Construction, as distinct from equipment, would take about $1.7 of the $5 billion drop if the plant-equipment spending ratios of last year held true without change for this year. The cut for construction may be lessened a bit, however, by the strong possibility that business firms are reducing their equipment spending more than their construction spending this year.

• **Some compensating factors**—Looked at overall, too, you find bright spots in the construction outlook. Compensating offsets in other construction categories will help to counterbalance the industrial-commercial decline. If a potential upturn in homebuilding comes through by fall as hoped, this category may show an increase of $1.3 billion this year, nearly $300 million higher than estimated last November in the Commerce-Labor joint forecast.

Highway construction spending this year also is to increase by nearly $700 million over last year, while expenditures on federal water projects and related construction may exceed 1957 by $300 million or more.

Hospital construction spending likewise will go up this year nearly $100 million. But military construction—for all its vast expenditures of more than $2 billion a year and the accelerated impetus being applied to it—will top last year by only about $70 million.

Most of this military increase, however, will probably go to U.S. jobs, which get more than half of the money spent on defense construction.

Military construction will get a boost from the $520 million it received in the January supplemental appropriation. Nearly all of this added money will go for domestic works. But the spending effect won't show up in volume until after the end of the year.

• **First full year forecast**—The new survey—based on returns gathered largely in February by the Commerce Department and the Securities and Exchange Commission—is the first government effort to measure plant and equipment spending for the whole year.

Last November, a McGraw-Hill survey showed business was planning a 7% reduction for 1958. However, the two surveys are not comparable. Commerce-SEC, for example, covers more small businesses. But the 7% decrease indicated last November, compared to the 13.2% drop in the new survey, can be taken as a rough indication of what happened to business planning as recession signs accumulated during the winter.

Another, and more direct indication of the same thing is a decline in expectations regarding the current quarter. Last December, the Commerce-SEC survey reported business spending plans at a seasonally adjusted annual rate of $35.5 billion this quarter. The new indication is for a rate of $34.0 billion—enough to be significant as a business softener, but far from a panic pace.

For the year as a whole compared to 1957, every major classification of industry but one seems to be headed for a drop.

The exception is public utilities—long a star performer in these surveys. Some $6.4 billion of new capacity will be put in place this year if utility executives carry through with their plans, up 4% over 1957.

(*B&F continued on page 182*)

Plant and Equipment Outlays to Drop 13.2% in 1958

(*SEC-Commerce estimates in millions of dollars*)

	1956	1957	% Change 1956-57	1958	% Change 1957-58
Total—All industry	$35,081	$36,962	+ 5.3	$32,074	−13.2
Manufacturing	14,954	15,959	+ 6.7	13,196	−17.3
Durable-goods industries	7,623	8,022	+ 5.2	6,225	−22.4
Iron and steel	1,268	1,722	+35.8	1,266	−26.5
Nonferrous metals	412	814	+97.5	470	−42.3
Electrical machinery & equipment	603	599	− 0.7	563	− 6.0
Machinery except electrical	1,078	1,275	+18.2	1,178	− 7.6
Motor vehicles & equipment	1,689	1,058	−37.4	768	−27.4
Transportation equipment excl. motor vehicles	440	544	+23.6	460	−15.4
Stone, clay & glass products	686	572	−16.7	448	−21.7
Other durable goods[1]	1,447	1,438	− 0.7	1,072	−25.5
Nondurable-goods industries	7,331	7,937	+ 8.2	6,971	−12.2
Food and beverages	799	850	+ 6.3	763	−10.2
Textile mill products	465	408	−12.3	252	−38.2
Paper & allied products	801	811	+ 1.2	622	−23.3
Chemicals & allied products	1,455	1,724	+18.4	1,621	− 6.0
Petroleum & coal products	3,135	3,453	+10.1	3,106	−10.0
Rubber products	201	200	− 0.5	170	−15.0
Other nondurable goods[2]	475	491	+ 3.3	437	−11.0
Mining	1,241	1,243	+ 0.1	1,058	−14.9
Railroads	1,231	1,396	+13.4	868	−37.8
Transportation, excl. railroad	1,712	1,771	+ 3.4	1,440	−18.7
Public utilities	4,895	6,195	+26.5	6,414	+ 3.5
Communications	2,684	3,032	+12.9	9,098	−12.5
Commercial and misc.[3]	8,364	7,366	−12.0		

[1] Includes fabricated metal products, lumber products, furniture and fixtures, instruments, ordnance, and miscellaneous manufacturers.
[2] Includes apparel and related products, tobacco, leather and leather products, and printing and publishing.
[3] Includes trade, service, finance, and construction.

Higher Road Costs

Court orders payment of 6% interest on right-of-way claims delayed by appeal

Highway right-of-way costs may get a big push upward in North Carolina as a result of a recent ruling by the state's Supreme Court. The court said that property owners whose land is condemned for highway purposes are entitled to interest of 6% a year on payments withheld until a final appeal court decisions are rendered.

"We think the ruling is going to have a significant effect," said Assistant Attorney General Kenneth Wooten, who is in charge of highway legal matters. "We know that we've got about 400 of these cases pending. My guess is that about half of them have been pending a year or more."

He said he was unable to make even a reasonable guess as to how much money the decision might cost the state. A study to determine this has been started.

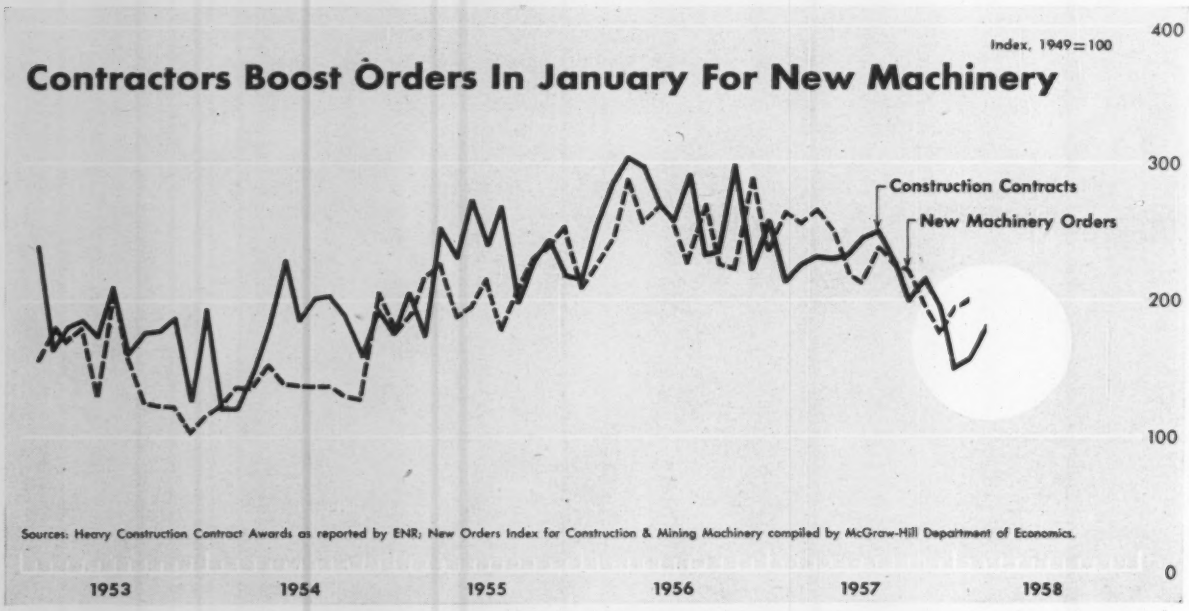
Mr. Wooten estimated that about 25 of the estimated 400 cases are 20-25 years old, 75 are at least 10 years old, about 150 are 5-10 years old, and the remaining 150 have been in litigation for less than five years.

State officials, studying the decision closely, have raised several questions over interpretation. Mr. Wooten questioned whether the decision applies to right-of-way payments delayed without litigation. After a "preliminary" study, Attorney General George Patton said he believes that interest is required only when the State Highway Commission is responsible for the delay. The state would not be liable for interest if the property owner prolonged a settlement in the courts.

The decision concerned a case dating back to 1952, when the house and lot of Mr. and Mrs. Arthur Debruhl in West Asheville were condemned. In subsequent court action they were evicted and their house torn down. The Highway Commission appealed a jury decision awarding the couple $12,000 and the case went to the Supreme Court. The court sent the case back for retrial, and this time the jury awarded the Debruhls $9,675. Again the commission appealed, and the present decision was the outcome. It read:

". . . Petitioners are entitled to have the jury award them interest at the rate of 6% on the fair market value of their property from the time their property was taken until the time the damages are paid." This holds true, "when there is nothing in the record to show the cause of the delay was the petitioner's fault."

Right-of-way claims against the North Carolina Highway Department amount to several hundred thousands of dollars a month.



Orders Index Scores Second Consecutive Upturn

Contractors increased their orders for new construction machinery for the second consecutive month in January, according to the McGraw-Hill Department of Economics' New Orders Index.

The January index is 202, based on 1949=100. This is up 2% over December 1957 and 12% higher than November, the low month of 1957.

Machinery manufacturers are forecasting orders at an index rate of 221 for the first quarter of 1958, which is 9% higher than the actual January volume. Manufacturers are also predicting a big upturn in sales during the second quarter, one that would push the average index for April-June to 274. In addition, they see a further slight rise in the third quarter to 277, followed by a dip to 273 on the index in the final three months of this year.

These quarterly forecasts of machinery orders, reported to the McGraw-Hill Department of Economics by a sample of firms in the industry, all add up to a prediction that the new orders index will average out at 261 for the full year of 1958, a 14% increase over 1957.

This contrasts with ENR's forecast of a 2% dip in 58 heavy construction contracts to an average monthly index of 216, based on 1949=100. If the contract award forecast proves correct, contractors may not buy much more dollars worth of new machines this year than they did in 1957.

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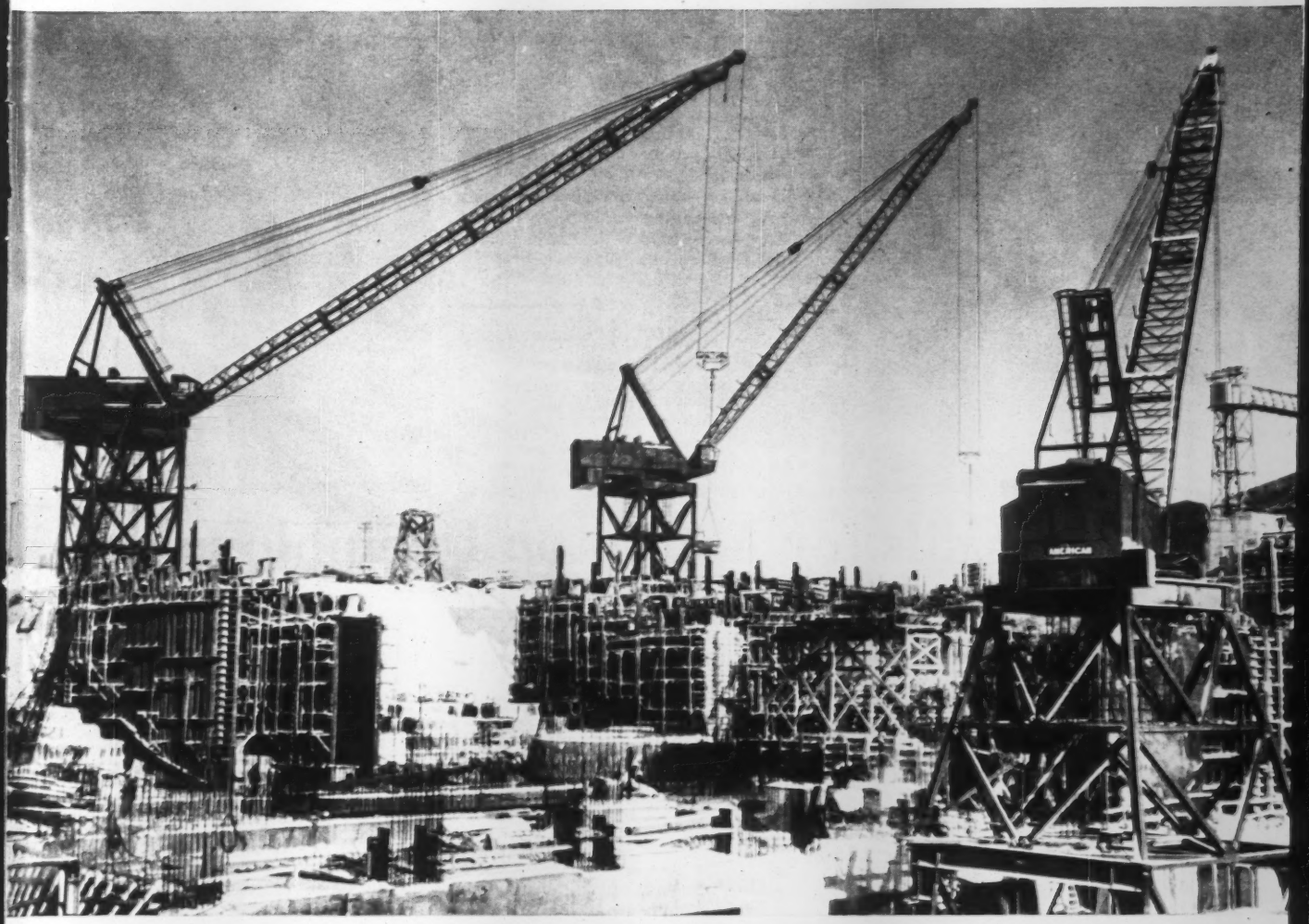

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As the number of idle workers continues to climb . . .

Labor Secretary Mitchell presents the problem:

- 5,173,000 persons unemployed—highest since 1941
- 3.3 million—nearly two-thirds—are claiming jobless pay
- Many have exhausted their state benefits

AFL-CIO President Meany suggests a cure:

- A federal income tax cut
- Bigger jobless benefits for a longer period
- Increased defense spending
- An expanded public works program

Labor Calls for Action on Unemployment

Last week, the AFL-CIO plunged headlong into a big campaign to shape the anti-recession program being hammered out in Washington.

To the Capitol, from all across the country, came some 1,000 top union officials for a three-day emergency economic and legislative conference. It began, in cavernous Shearton Hall under banners demanding "Put America Back to Work!", with federation President George Meany laying down labor's concept of what the sagging economy needs. The campaign ultimately spread out to the White House and Capitol Hill, where labor's spokesmen made their arguments in person before the executive and legislative officials who will make the decision.

The conference was sharply timed. On Tuesday morning, even as President Meany stood in the glare of television lights to demand tax cuts and other pump priming moves at once, came the official government announcement that unemployment in February climbed to 5,173,000.

This is a jump of 700,000 over the month before; an increase of 2 million from the year before. Most of the jobless—now 6.7% of the labor force—are factory workers—steel, auto, machinery, aircraft. Construction employment is down 300,000 from last month, 350,000 from a year ago.

Of the unemployed, nearly two-thirds, or 3.3 million, have filed claims for or are getting unemployment compensation. Since September, over $1 billion has been paid out by the states in jobless pay. But many of the idle have exhausted their state benefits. The figure was 1,191,000 of the end of December. Additional thousands are on involuntary short work weeks—which means shrunken pay checks and ineligibility for state or supplementary unemployment benefits.

It was precisely this sort of situation that labor leaders had counted on in their timing—first, to impart a sense of evangelical urgency to the conference delegates; second, to put politicians—ever more sensitive to economic distress—in a frame of mind to listen, at least, to those who think they have recession remedies.

The grim statistics underscored the common theme in the major anti-recession proposals from every front: Unemployment must not be allowed to feed on itself. Quick ways must be found to put cash into the pockets of people for immediate spending. And this, in turn, explains the current emphasis on two proposals—an upward revision or extension of jobless benefits and a federal income tax cut that would add to the pay envelope by reducing the withholding tax.

• Proposals—In this atmosphere, President Meany prescribed a big dose of economic medicine for almost everyone:

• Federal government—Cut individual income taxes, extend and liberalize unemployment benefits, pump extra billions into defense and public works spending for highways, schools, hospitals, airports, public housing.

• Organized labor—Be firm at the collective bargaining table, "Don't let anyone tell you this is the time to hold the line on wages."

• Business—Cut prices on individual items and bet on bigger profits off a larger volume of sales.

Immediately behind Mr. Meany came Secretary of Labor James P. Mitchell to tell the delegates what the Administration is doing and proposes to do. His address contained no unexpected proposal for federal action, but most observers felt it was the most cohesive presentation thus far of the Administration's viewpoint on what to do about the recession.

Insofar as the basic elements of a program are concerned, a parallel can be drawn—up to a certain point—between the AFL-CIO and the Administration positions. But there are sharp differences in emphasis and timing, and these are vital.

For example, Mr. Meany spoke of pressuring for a whole bundle of legislation now—tax cuts, improved unemployment benefits and increased defense spending to accompany a stepped-up public works program.

Mr. Mitchell, in behalf of the Administration, rejected a "massive new public works spending program" and said a tax cut would be preferable, but

would be resorted to only if the recession "proves more stubborn than is anticipated."

President Meany put tax reduction—via an increase of personal exemption from $600 to at least $700, possibly more—at the top of labor's priority list and proposes it for individuals only.

Secretary Mitchell countered that, if and when it comes, taxes should be cut for individuals and business in order to put new money into the hands of both consumers and investors. (Vice President Richard M. Nixon, a day earlier, had taken the same approach—any tax cut should be for both individuals and business.)

• **Unemployment insurance**—An income tax cut, however, is of no immediate help to the incomeless unemployed. The ALF-CIO insists it be coupled with sharply improved unemployment compensation benefits, which President Meany says "would immediately put more purchasing power into the market place."

Improvements in state jobless insurance standards is an old issue (see box). Critical problems are numerous but the chief criticism is that present standards (coverage, eligibility, amount and duration of benefits) are so out of step with the times that the system is not serving as the recession cushion it was intended to be.

Because the insurance plan was established by federal law and operates under minimum standards established by Congress, the power of Congress to set new standards—and thus force the states to improve theirs—isn't questioned. But so far the problem of improvements has been left largely to the states. And President Meany says they have failed to take the necessary action because of the "political power" of business interests, for any liberalization in benefits adds to the payroll tax of employers, often hitting the seasonal ones the hardest. (During the first 20 years of the system, over $20 billion was collected in taxes.)

The Administration's approach is to leave permanent reforms up to the states but to step in with temporary federal aid when an individual has exhausted his state benefits. It would extend jobless benefits for 13 weeks beyond the state duration periods and pick up the tab for the extra cost.

A similar solution is urged by Democratic leaders in the House—a 16-week extension with a boost in average benefits to about $40 a week.

The AFL-CIO last week called such proposals a poor substitute for "what should and must be done." And that, it says, is an across-the-board improvement in state standards and benefits.

When the delegates to the emergency conference converged on Capitol Hill, they urged their senators and congressmen to support a jobless insurance bill introduced by Senator Kennedy and Representative McCarthy.

That bill would require the states to

The Unemployment Insurance System

STRUCTURE: Based on the Social Security Act of 1935, the unemployment compensation system is a state-federal program to give wage earners some income when involuntarily unemployed. It is handled by the individual states—each with its own law and program. Under the Federal Unemployment Tax Act, the federal government levies a payroll tax on employers with four or more employees, allowing up to 90% credit for unemployment taxes paid to the states. Costs of administering state programs are paid by federal grants. Benefits paid by the states come from a federal trust fund in which the money is kept.

To qualify for federal grants and tax credits, state systems must meet minimum standards imposed by Congress—such as sole use of the funds for unemployment purposes, fair hearings on denial of claims, eligibility requirements that don't require strike breaking or working for substandard wages.

Originally, one of the reasons why a federal system was not adopted was a fear that such a law would be found unconstitutional. The doubt has been removed by a Supreme Court decision upholding the unemployment provisions in the Social Security Act on the basis of the federal government's power to promote the general welfare.

Over 43 million workers—about two-thirds of the nation's labor force—are covered by the system.

STATE LAWS: By 1937 all states had adopted some form of unemployment insurance meeting the qualifications of federal law. But they differ widely in coverage, eligibility, benefit amounts and duration. Maximum weekly benefits specified by law range from a low of $25 for 20 weeks in Louisana to a high of $41 for 26 weeks in Wyoming. Average is about $30 for 26 weeks. (Last year, actual weekly benefits paid ranged from $17.80 in North Carolina to $32.23 in Nevada—average was $27.53). Here's a breakdown of what the laws provide:

Maximum Basic Weekly Benefit* Amount and Duration

Maximum Basic Benefit	States	Maximum Weeks	States
Over $40	1	30	1
$40	4	26½	1
$36-$39	5	26	27
$35	7	24	4
$32-$34	10	22	3
$30	11	20	9
$26-$28	9	18	2
$25	1	16	1

* This does not include dependents' allowances, which increase the maximum weekly allowance in a quarter of the states.

CURRENT PROBLEMS: Critical problem is that weekly benefits are too small and too short to serve their intended purpose—to meet an unemployed worker's nondeferrable expenses and to tide him over until he finds another job. Average weekly earnings of production workers have risen to $82.92. Jobless benefits now replace only a third of that wage loss. Meanwhile, many are exhausting their benefits while still unemployed—147,000 exhaustions in January with prospects of a rapid increase.

Since 1954, the Administration has urged a uniform level of benefits that would equal one-half average weekly earnings. In 1957, jobless benefit improvements were considered by 44 states. All but three passed liberalizing amendments but only seven moved up to the 50% level.

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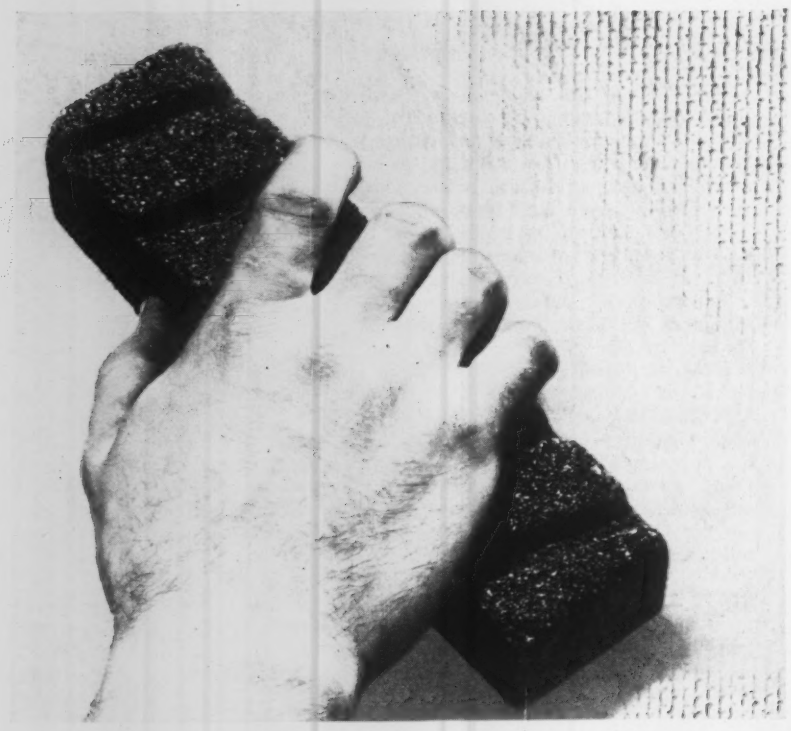

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boost their benefits to at least one-half the state's average weekly wage (with two-thirds the average wage being the cutoff point), to extend the duration period of benefits to a minimum of 39 weeks, and to liberalize eligibility requirements.

• **Wary of haste**—Despite the AFL-CIO plea of urgency for legislation to keep the recession from feeding on itself, both Congress and the Administration seemed wary of moving hastily. "This is not the time for ill advised action," Secretary Mitchell told the AFL-CIO.

On tax cuts, the Administration expressed an inclination to wait for further developments in the economy. On unemployment insurance, House Speaker Sam Rayburn indicated it might be Easter before a bill is passed.

Meanwhile, the states were moving ahead on their own to improve their jobless benefits. New York voted to increase its benefit period from 26 to 39 weeks; a boost in the maximum weekly amount from $36 to $45 seems likely. Michigan is moving to extend benefits for those who have exhausted theirs. Connecticut is holding a special legislative session to consider liberalization of its system. Bills for benefit improvements are under consideration in New Jersey, Kentucky and Maryland.

NLRB Amends Rules

Adopts new procedure in jurisdictional disputes

The National Labor Relations Board has amended its rules and regulations relating to the handling of jurisdictional disputes over work assignments.

Under the new rules, published in the Federal Register on February 27, the NLRB will retain jurisdiction over an unfair labor practice charge and issue a complaint whenever recourse by the disputing parties to the National Joint Board for the Settlement of Jurisdictional Disputes has failed to end the dispute.

The change gives effect to a recent board decision in a dispute between lathers and carpenters over acoustical ceiling work (ENR Jan. 30, p. 78). That decision reversed a long-standing NLRB rule requiring dismissal of an unfair labor practice charge if the disputing unions were subject to the voluntary procedure of the Joint Board even though the latter might not be able to get the parties to comply with its decision.

As stated in the amended rules, this is what contractors and unions can now look forward to when an unfair labor

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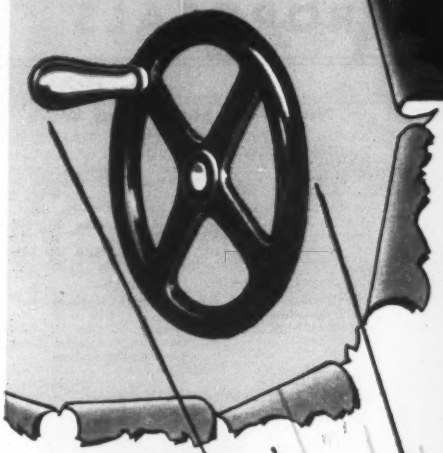

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practice charge is filed claiming that a union is striking to force an employer to make a work assignment in its favor:

The NLRB regional director will investigate the charge. If it appears valid, he may seek a temporary restraining order. Next step is the scheduling of a hearing (Sec. 10k) to hear and determine the dispute. If the examiner finds that the parties have agreed on a method of voluntary settlement (the Joint Board), he will defer action on—not dismiss—the charge and call a halt to the 10(k) hearing.

If the dispute is not settled voluntarily and the strike continues, the regional director can proceed directly with the issuance of an unfair labor practice complaint. After the complaint is issued, a regular NLRB hearing takes place. If the charge is sustained, the NLRB can order an end to the work stoppage—something the Joint Board is powerless to do effectively itself.

Registered Apprentices In Construction Decline

The construction industry suffered a drop in the number of its registered apprentices last year, according to figures released this month by the U. S. Department of Labor's Bureau of Apprenticeship and Training.

The bureau reports that 110,405 building trades apprentices were registered under the National Apprenticeship Program at the end of 1957. This compares with 112,619 as of December 31, 1956.

Trades that held their own or showed some improvement were bricklayers, stone masons and tilesetters; cement masons; plumbers and pipefitters; roofers; sheet metal workers; iron workers. Those with a drop: carpenters, electricians, glaziers, painters, plasterers.

Cooperating in the national program are 11 international building trades unions and 12 national employer associations, which have adopted national apprenticeship standards for 18 trades.

Labor Briefs . . .

• **Local labor**—Disturbed over use of out of town workers, local building trades unions in Hamilton, Ontario, have asked for a pre-job conference on a $6 million addition to the Ontario Mental Hospital. One union is urging a subcontract clause requiring employment of local labor.

• **State council**—A statewide organization to coordinate the programs of building trades unions has been formed in Arkansas. Known as the Arkansas Building Trades Council, it has 44 local unions as charter members.

OFFICIAL PROPOSALS

Bids: April 1, 1958

Toledo-Lucas County Port Authority Toledo, Ohio

PORT OF TOLEDO—PRESQUE ISLE SITE

NOTICE IS HEREBY GIVEN by the Board of Directors that Sealed Bids will be received by the Toledo-Lucas County Port Authority for:

STAGE I—CONTRACT 1
DREDGING, BULKHEAD CONSTRUCTION AND HYDRAULIC FILL

Construction of the Port of Toledo—Presque Isle Site.
The principal items of work are:

Estimated		Item
Lump Sum		—Clearing Site
Lump Sum		—Approximately 3,400 linear feet of earth dike construction including trenching
Lump Sum		—Approximately 1,000 linear feet of steel sheet pile bulkhead
300,000	Cubic Yards	—Removal of Silt
400,000	Cubic Yards	—Dredging for Filling
9,000	Tons	—Riprap slope protection on 6 inch gravel bedding

Bids for the above described work will be received at the offices of the Toledo-Lucas County Port Authority, 241 Superior Street, Toledo 4, Ohio, until 10:00 A. M. (EST), April 1, 1958 and will be publicly opened and read aloud immediately thereafter at the offices of the Authority.
Bidders must file with the Authority at least ten days prior to the time of receipt of bids, a confidential Financial Statement and Experience Questionnaire on form furnished by the Authority. Plans, Specifications, Proposal and forms of Proposal Bond, Contract and Contract Bond are on file at the offices of the Toledo-Lucas County Port Authority, 241 Superior Street, Toledo 4, Ohio, and the offices of the Engineers Parsons, Brinckerhoff, Hall & Macdonald, 51 Broadway, New York 6, New York where they may be inspected by prospective Bidders during office hours.
Plans and Specifications (including Proposal Form, Proposal Bond Form, Contract and Contract Bond Form) will be furnished to prospective bidders for $25.00 per set. No refund will be made for any of the above stated charges.
Proposals must be submitted on the form furnished by the Authority; must contain the name of every person interested therein and shall be accompanied by a Proposal Bond, with satisfactory surety, in an amount of not less than two and a half percent (2½%) of the total amount bid, specifying the Toledo-Lucas County Port Authority as the obligee, and a certified check on a solvent bank or a cashier's check, in the amount of not less than two and a half percent (2½%) of the total amount bid, subject to the conditions stated in the Specifications.
The successful Bidder will be required to furnish a satisfactory Performance Bond.
Any bid may be withdrawn prior to the scheduled closing time for receipt of bids.
The Authority reserves the right to reject any or all bids and to waive any technicalities as it may deem best for the interest of the Authority.
NOTE: Plans and Specifications will not be mailed prior to the receipt of payment of cost shown in this Advertisement.

TOLEDO-LUCAS COUNTY PORT AUTHORITY
W. W. Knight, Jr.—Chairman
E. O. Jewell—General Manager

U. S. Government

GOVERNMENT OF DISTRICT OF COLUMBIA, DEPT. OF SANITARY ENGINEERING, D. C., March 6, 1958. SEALED PROPOSALS will be received in Room 404, 499 Pennsylvania Avenue, N.W., Washington 1, D. C., until 2 PM, EST, April 10, 1958, and then publicly opened and read for construction of the Sewage Treatment Plant, Aerated Grit Chambers, Unit 1A. Proposal forms, plans and specifications obtainable from Supervisor, Bid & Contract Section, Procurement Office, D. C., Rm. 404, 499 Pennsylvania Avenue, N.W., upon deposit of a certified check for $50.00 per set, payable to Collector of Taxes, D. C. (Telephone NA 8-6000, Extension 2378).

Bids: April 10, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.,—Pursuant to the provisions of the Highway Law, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 10th day of April 1958, by Henry A. Cohen, Director Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following Projects:

County	Contract No.	Name
DISTRICT No. 10, M. E. Gout, District Engineer, 325 West Main Street, Babylon, L. I., New York.		
Queens	HHE 58-1	Horace Harding Expressway, Section 2, Contract 6 (Douglaston Pumping Station)

Miles	Type	Deposit	Estimated Cost of Work
–	Construction of Pumping Station Building and Improvement of Grounds	$20,000 Plans $3	$365,000

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.
In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.
Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.
The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.
Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.
Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".
The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: May 12, 1958

Government of Iraq Electrification of Central Euphrates Zone Contract No. 20— Steel Cored Aluminum Cables

The Development Board and Ministry of Development of the Government of Iraq invite tenders from qualified firms for the supply and delivery of the Steel Cored Aluminium Cables for 300 km of double circuit 132 kV and 66 kV power transmission lines for the Central Euphrates Zone electrical system.

Full information regarding this tender can be obtained on and after March 3, 1958 until May 12, 1958, from Embassy of Iraq, Washington, or Messrs. Electrobel-Traction et Electricite, 1, Place du Trone Brussels, Belgium.

All Tender Documents are to be submitted in English to the Ministry of Development, on or before 12 noon, local time, on June 16, 1958.

Minister of Development.

OFFICIAL PROPOSALS

Bids: April 3, 1958.

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and special provisions for projects financed with Federal Aid Funds, sealed proposals will be received until ten-thirty o'clock A. M., eastern standard time, on the 3rd day of April 1958, by Henry A. Cohen, Director Bureau of Contracts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following Projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
DISTRICT No. 4, B. F. PERRY, District Engineer, Barge Canal Terminal, Rochester 1, New York						
Livingston (Rte. 36)	FARC 58-9	Caledonia-Mt. Morris, Part 1, S.H. 5593 Project S-172(2)	1.32	Asphalt Concrete = 1.30 Mi. Misc. Work = 0.02 Mi.	$20,000 Plans $3	$371,000
Monroe	FIC 58-2	Interstate Route No. 580-2-6 (Rochester City-Eastern Expressway; Pts. 2 and 3) Project I-1107(6)	2.50 (3.43 Acc.)	9" Cement Concrete Pavt. = 2.20 Mi.; Asphalt Concrete Pavt. = 0.29 Mi.; Misc. Work = 0.01 Mi. Including 3 H.G.S. and R.F.G.S. Comp. I-Beams, 1 @ 238', 2 @ 159.4'; 4 H.G.S. Comp. I-Beams 154', 118', 164.2', 133.3'; 1 Ped. Overpass I-Beam 203.2'	$400,000 Plans $20	$7,309,000
Orleans (Rte. 104)	FARC 58-11	Gaines-Murray, Pt. 1, S.H. 8237; Gaines-Murray, Pt. 2, S.H. 5697. Project F-366(3)	7.24	Asphalt Concrete = 7.19 Mi. Misc. Work = 0.05 Mi.	$26,000 Plans $2	$470,000
Orleans (Rte. 237)	FARC 58-10	Clarendon-Holley (Clarendon-Genesee Co. Line, Pt. 1), S.H. 391. Project S-408(2)	0.26	Asphalt Concrete = 0.22 Mi. Misc Work = 0.04 Mi.	$2,700 Plans $2	$49,000
DISTRICT No. 8, K. G. RAUER, District Engineer, Pleasant Valley Road, Poughkeepsie, New York						
Rockland (Rte. 59)	RC 58-12	Knapps Corners-Nyack, S.H. 5178	0.14	Asphalt Concrete = 0.14 Mi.	$3,000 Plans $2	$53,000
Westchester (Rte. 127)	FARC 58-18	Lake St., Ridge St., and Harrison Ave., S.H. 1457 White Plains Town Line-Harrison, S.H. 780 Project S-468(1)	0.96	Asphalt Concrete = 0.95 Mi. Misc. Work = 0.01 Mi.	$24,000 Plans $2	$439,000
DISTRICT No. 10, M. E. GOUL, District Engineer, 325 W. Main Street, Babylon, L. I., New York						
Nassau & Suffolk	NSP 58-2	Northern State Parkway	38.10	Fencing	$12,000 Plans $2	$219,000
	SAGSP 58-1	Sagtikos State Parkway				
	CAPSP 58-1	Captree State Parkway				
	SSP 58-2	Southern State Parkway				
	WSP 58-1	Wantagh State Parkway				

Any projects in this letting that are on the Federal Aid highway systems are subject to the provisions of the "Federal-Aid Highway Act of 1956", being Public Law 627, 84th Congress, approved June 29, 1956, and are also subject to the applicable New York State statutes.

In compliance with the provisions of Section 115 (Prevailing Rate of Wage) Public Law 627, the minimum wages to be paid laborers and mechanics are included in wage schedules that are set out in the bid proposal.

Maps, plans, specifications and proposal forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bid; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidders is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to priorities and allocations under the Defense Production Act of 1950, as amended, and all regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum as specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Laws, as set forth in "Instructions to Bidders".

The right is reserved to reject any or all bids.

JOHN W. JOHNSON
SUPT. OF PUBLIC WORKS

Bids: April 14, 1958

Lake Brandt Improvements for the Water Supply of the City of Greensboro, North Carolina

Sealed proposals will be received by the City of Greensboro, North Carolina, until 10 a.m. E.S.T. April 14, 1958, and then publicly opened and read for the construction of a new dam, spillway, earth embankments and a new pumping station and intake in connection with it, including transfer and installing of engines, pumps and auxiliary equipment, connecting raw water pipe line, demolition of old pumping station, sealing of the old spillway and dam as set forth in the detailed specifications.

The work will be divided into four (4) contracts as follows:

Contract 1. General
Contract 2. Plumbing
Contract 3. Heating
Contract 4. Electrical

Proposals must be enclosed in a sealed envelope addressed to the Mayor and City Council, City of Greensboro, N. C. and the outside of the envelope must be marked "Proposal for Construction of the Lake Brandt Improvement Works." All proposals must be made on the blank forms included in the contract documents. The name, address, and license number of the bidder shall be plainly marked thereon.

No proposal shall be considered or accepted by the City Council unless at the time of its filing the same shall be accompanied by a deposit with the City of Greensboro, of cash or a certified check on some bank or trust company insured by the Federal Deposit Insurance Corporation, in an amount equal to not less than five per cent (5%) of the proposal. In lieu of making the cash deposit as above provided, such bidder may file a bid bond executed by a corporate surety licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will upon demand forthwith make payment to the City of Greensboro upon said bond if the bidder fails to execute the contract in accordance with the bid bond, and upon failure to forthwith make payment, the surety shall pay to the City of Greensboro an amount equal to double the amount of said bid bond. This deposit shall be retained if the successful bidder fails to execute the contract within ten days after the award or fails to give satisfactory surety as required herein.

Consideration will be given only to proposals submitted by contractors licensed under the contractor Licensing Act of 1925 or as amended.

Plans and specifications are on file and may be examined at the office of the consulting engineers, Hazen and Sawyer, 122 East 42nd Street, New York, N. Y., and at the office of the Director of Public Service, Municipal Building, Greensboro, N. C. They may also be examined at the office of the Associated General Contractors in Charlotte and Greensboro; and at the Dodge Plan Rooms in Greensboro and Atlanta, Georgia. They may be obtained upon application to the Engineers or to the City accompanied by a check deposit in the amount of Fifty Dollars ($50.00), made payable to the City of Greensboro. This deposit will be refunded to all who submit bona fide bids; to those who find that they cannot bid and who return plans on or before the time of opening bids; and to material and equipment suppliers who return plans and specifications in good condition within ten (10) days after bid opening date.

The City reserves the right to reject any or all bids, to waive informalities, and to award contracts which in the opinion of the City appear to be in its best interest. The right is reserved to hold any or all proposals for a period of thirty (30) days from the date of opening thereof.

George H. Roach, Mayor
James R. Townsend, City Manager

Bids: April 10, 1958.

Contract No. R11:1-101.1 Department of Forests and Waters Commonwealth of Pennsylvania Glendale Dam on Beaverdam Run Cambria County, Pennsylvania

Sealed proposals for constructing an earth dam and appurtenant structures for the above flood control and recreational project will be received at the office of The Secretary of Forests and Waters, Room 512, Education Building, Harrisburg, Pennsylvania, until 2:00 P.M., E.S.T., April 10, 1958, at which time said proposals will be publicly opened and read.

The principal items of work include:

Rolled Embankment	630,000 c.y.
Concrete	4,600 c.y.
Reinforcing Steel	420,000 lb.
Excavating, Stripping and Grubbing	162,000 c.y.
Filters	37,500 tons
Rock Facing, Riprap	25,700 c.y.
1¼" Diamond Drilling	10,000 l.f.

Each bidder must submit an experience record, bid deposit, and equipment statement.

Contract documents may be examined during office hours at the Division of Flood Control Office, Department of Forests and Waters, Room 465, Education Building, Harrisburg, Pennsylvania, and at the office of the Consulting Engineers, Gannett, Fleming, Corddry and Carpenter, Inc., 600 North Second Street, Harrisburg, Pennsylvania. Contract documents will be furnished upon payment of forty dollars ($40.00) for each set, upon application to the Division of Flood Control, Department of Forests and Waters. Contract documents need not be returned and the payment WILL NOT be refunded.

MAURICE K. GODDARD
Secretary, Department of
Forests and Waters
Commonwealth of Pennsylvania

OFFICIAL PROPOSALS

Bids: April 24, 1958.

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
for the
Construction of Work Section No. 4
of the Waterways and Reservoir
in
Lewiston
Niagara County, New York
Specification No. PA-N-23005
Niagara Contract No. N8

NOTICE TO CONTRACTORS:

The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the Construction of the Waterways and Reservoir Work Section No. 4 and appurtenant works. Located in Lewiston, Niagara County, New York on April 24, 1958, at 10:30 A.M., Eastern Standard Time, at the Authority's office, 18th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are as follows:

10,400,000 tons concrete aggregate and filter material production
9,540,000 cu. yds. excavation, unclassified
7,800,000 cu. yds. unclassified fill in reservoir embankments
1,380 tons structural steel

All work shall be completed on or before one thousand ninety-six (1096) calendar days after the date of receipt of Notice of Award.

Plans, Specifications and Proposal forms for the work may be obtained from the Power Authority of the State of New York, at the Coliseum Tower, 18th floor, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of fifty ($50.00) dollars per initial set of Contract Documents, and tweny-five ($25.00) dollars per set for additional sets, no part of which shall be refunded. Plans, Specifications and Proposal forms for the work will be on file in the Authority's office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum price bid.

The right is reserved to reject any or all bids.

W. S. Chapin
General Manager

Bids: April 8, 1958.

Power Authority of the State of New York

ADVERTISEMENT FOR PROPOSALS
for the
Construction of the Plattsburgh Area
Transmission Lines
Specification No. PA-6-35
Contract No. T6

NOTICE TO CONTRACTORS:

The POWER AUTHORITY OF THE STATE OF NEW YORK will receive sealed proposals for the complete installation of the Plattsburgh Area Transmission Lines near Plattsburgh, New York, until 10:30 A.M. Eastern Standard Time on the 8th day of April, 1958, at the Authority's office, 18th floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are estimated:

Installation of 200 wood pole structures of various types, for 115 kv and 46 kv operation—poles, crossarms and braces furnished by the Authority.
Installation of 100,000 pounds steel tower structures—structural steel and accessories furnished by the Authority.
Stringing 24 miles of three phase transmission line conductors and overhead ground wire—conductors and overhead ground wires furnished by the Authority.

The work shall be completed on or before April 1, 1959.

Plans, Specifications and Proposal Forms for the work may be obtained only from the Power Authority of the State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of ten dollars ($10.00) for initial set of Contract Documents and Five Dollars ($5.00) for each additional set, no part of which will be refunded. Two sets must be returned with each bid. Plans, Specifications and Proposal Forms will be on file in the Authority's office and in the office of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, for the inspection by prospective bidders.

Bids must be made in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. Chapin
General Manager

Bids: April 17, 1958.

Construction of Sewage Treatment Plant City of Poughkeepsie Dutchess County, New York

NOTICE TO CONTRACTORS

Sealed bids for construction of Sewage Treatment Plant in the City of Poughkeepsie will be received by the Commissioner of Finance, City Hall, Poughkeepsie, New York, until 10:00 A.M., Eastern Standard Time, April 17, 1958, and there at said office and at said time will be publicly opened and read aloud.

The General Contract includes the construction of the following major Items:

Screen & Grit Building
Administration Building
3—Digesters 50 feet in diameter with a Control Building
4—Settling Tanks each approximately 16' x 116' long
Outfall Sewer
Vacuum Filters

Proposals will be received for the following Contracts:

Contract No. 1—General Construction
Contract No. 2—Heating & Ventilating
Contract No. 3—Electrical
Contract No. 4—Plumbing

Plans and documents may be examined at no expense at the office of the Commissioner of Finance, City Hall, Poughkeepsie, N. Y., and copies of the same obtained thereupon payment of $50.00 for each set. Any bidder upon returning said set in good condition within thirty (30) days of the date of receiving bids will be refunded his payment, and any non-bidder upon so returning said set will be refunded $20.00.

The Plans and Documents may be examined in the office of the Superintendent of Public Works, Eastman Park, Poughkeepsie, N. Y., or at the office of O'Brien & Gere, Consulting Engineers, 400 East Genesee Street, Syracuse, New York.

Each bid must be accompanied by security in an amount not less than five percentum (5%) of the amount of the bid in the form and subject to the conditions provided in the Information for Bidders contained in the Contract Documents.

The right is reserved to waive any informalities in the bids and to reject any or all bids.

DEPARTMENT OF FINANCE OF
THE CITY OF POUGHKEEPSIE
Aubrey B. Coons
(Commissioner of Finance)

Dated: March 20, 1958

Bids: April 8, 1958

Commonwealth of Pennsylvania Department of Forests and Waters Harrisburg, Pennsylvania

NOTICE TO BIDDERS

Sealed bids will be received by the Secretary of Forests and Waters at Room 512, Education Building, Harrisburg, until 2:00 P.M., E.S.T., April 8, 1958 and will be publicly opened and read for Dredging, Bulkhead Construction, and Fill for Duquesne Pier, Port of Erie Development Project, Erie, Erie County, Pennsylvania.

Specifications, Drawings and Bid Forms may be obtained in the office of the Division of Flood Control, Department of Forests and Waters, Room 465, Education Building, Harrisburg, Pennsylvania, upon payment of $25.00 per set, which mony WILL NOT be refunded. Drawings and Specifications may be reviewed free of charge at the office of the Port Commission of the City of Erie, City Hall Annex, Erie, Pennsylvania, and at Parsons, Brinckeroff, Hall & Macdonald, Engineers, 51 Broadway, New York 6, New York.

Approximate quantities of principal construction items are as follows: 73,000 cubic yards of silt removal; 45,000 cubic yards of dredging of shale and its placement and fill; 650 lineal feet of steel sheet pile bulkhead construction; and 2,700 tons of rip-rap slope protection in place.

Each bid must be accompanied by a bid bond, or a certified depositor's bank check, or certified bank cashier's, or certified bank treasurer's check drawn to the order of the Commonwealth of Pennsylvania as a proposal guarantee in the amount of ten (10) percent of the total amount of bid. Checks of unsuccessful bidders will be returned as soon as practicable after opening of bids. A joint venture bid will not be considered and all proposals must be filled in, signed and executed.

The Commonwealth of Pennsylvania reserves the right to reject any or all bids and to waive technicalities in bids.

MAURICE K. GODDARD
Secretary of Forests
and Waters

Bids: April 17, 1958.

Construction of Intercepting Sewers City of Poughkeepsie Dutchess County, New York

NOTICE TO CONTRACTORS

Sealed bids for construction of Intercepting Sewers in the City of Poughkeepsie, will be received by the Commissioner of Finance, City Hall, Poughkeepsie, N. Y., until 10:00 A.M., Eastern Standard Time, April 17, 1958, and there at said office and at said time will be publicly opened and read aloud.

This Contract includes the construction of the following approximate quantities of major items:

8-inch V.C. Sewer	95 l.f.
12-inch V.C. Sewer	109 l.f.
15-inch V.C. Sewer	39 l.f.
18-inch V.C. Sewer	545 l.f.
21-inch V.C. Sewer	31 l.f.
20-inch A.C. Sewer	868 l.f.
24-inch A.C. Sewer	858 l.f.
24-inch C.I. Sewer	178 l.f.
30-inch R.C. Sewer	92 l.f.
33-inch R.C. Sewer	358 l.f.
36-inch R.C. Sewer	1328 l.f.
48-inch R.C. Sewer	23 l.f.
36-inch Rock Tunnel Sewer	2585 l.f.
48-inch Rock Tunnel Sewer	311 l.f.
Pine St. Siphon & Appurtenances	

Alternate Proposals will be received for 30-inch R.C. sewer construction in open cut and tunnel to replace the Pine Street Siphon and associated appurtenances.

Plans and Documents may be examined at no expense at the office of the Commissioner of Finance, City Hall, Poughkeepsie, New York, and copies of the same obtained there upon payment of $30.00 for each set. Any bidder upon returning said set in good condition within thirty (30) days of the date of receiving bids will be refunded his payment, and any non-bidder upon so returning said set will be refunded $15.00.

The Plans and Documents may be examined in the office of the Superintendent of Public Works, Eastman Park, Poughkeepsie, N. Y., or at the office of O'Brien & Gere, Consulting Engineers, 400 East Genesee Street, Syracuse, New York.

Each bid must be accompanied by security in an amount not less than five percentum (5%) of the amount of the bid in the form and subject to the conditions provided in the Information for Bidders contained in the Contract Documents.

The right is reserved to waive any informalities in the bids and to reject any or all bids.

DEPARTMENT OF FINANCE OF
THE CITY OF POUGHKEEPSIE
By: Rubrey B. Coons
(Commissioner of Finance)

Dated: March 20, 1958

Read the Official Proposal Columns of ENGINEERING NEWS-RECORD This Week and Every Week

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Send to office nearest you.
NEW YORK 36: P. O. BOX 12
CHICAGO 11: 520 N. Michigan Ave.
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POSITIONS VACANT

Construction Sales Manager 29-33. Grad. Engr., preferably Civil, with outstanding management ability. Well-established NYC bldg. contr. Must be avail. for several interviews in NYC. P-7554, Engineering News-Record.

Want Concrete Plant Supervisor familiar with Johnson Automatic Central Mix Plant. Please furnish references, education, experience and salary requirements. P-7387, Engineering News-Record.

Electrical Engineer—Supervision of electrical maintenance, preparation of contract specifications for electrical construction and equipment. Large medical research center desires applicants who have an electrical engineering degree from an accredited college plus 3½ years professional experience. Salary $8645 plus the opportunities, fringe benefits and protection of the Federal Civil Service Merit System. Send resume of experience and education to Personnel Officer, National Institutes of Health, Bethesda 14, Maryland.

Experienced Sewer, Grading and Paving Foremen—Steady Employment to qualified Men—Northeastern Ohio. Please reply, giving qualifications and experience, to P-7121, Engineering News-Record.

The Board of Control, Ketchikan Public Utilities, invites interested persons to submit their applications to fill the position of Utility Manager. The Ketchikan Public Utilities are municipally-owned and consist of Water, Telephone and Power and Light Generation and Distribution. Applications should be addressed to Mr. R. M. Hardcastle, Chairman, Board of Control, Ketchikan Public Utilities, P. O. Box 1019, Ketchikan, Alaska.

Construction Superintendent for bridges etc. Steady employment to qualified man, Dakota location. Please reply P-7429, Engineering News-Record.

Traffic Engineer to head county traffic engineering staff. CE with grad work traffic. Min 1 yr exp respn chge traffic engr. Duties traffic studies, plans for signals, signs etc. Formal app sent to those who qualify. Mail brief resume to P-7436, Engineering News-Record.

Sales Engineer to introduce outstanding product in sanitary and water supply fields. Young, aggressive, well-financed company. Salary open. Location: Southeast. P-7437, Engineering News-Record.

Civil Engrs., Bridge Designers, Draftsmen. Design work. Steven Antonoff Cons. Engrs., 806 Park Ave. Bldg., Detroit 26, Mich.

Young Man—(30-40)—Civil Engineer for costs, layout, expediting and co-ordinating the construction of bituminous road work. **Car furnished,** steady employment and advancement, wages commensurate with ability. Write Box 120, Haverstraw, New York.

Equipment Superintendent—Position open for Equipment superintendent to take complete supervisory charge of maintaining equipment for General Contractor in Eastern Pennsylvania. Permanent position. State previous experience and availability. Reply to P-7442, Engineering News-Record.

POSITIONS VACANT

Resident Engineer—thoroughly experienced in construction of large sewage treatment and disposal facilities. Upstate New York location. Salary open. Reply to P-7444, Engineering News-Record.

A growing architectural-engineering and building firm has an opening for mechanical-electrical engineer. Must have had experience in design and supervision of mechanical and electrical equipment for industrial building and processing. Permanent position—excellent working conditions. Reply with complete resume—P.O. Box 349, Princeton, New Jersey.

Chief Civil Engineer—Highways. Extensive administrative experience, modern highway design, either former state highway or consulting engineering experience acceptable. Salary high. Bonus incentive. P-7453, Engineering News-Record.

6—Concrete, asphalt, soils Engineer, Technicians and inspectors for immediate long term in Mid-western states. Salary range dependent upon experience and education. For consideration, send resume, snapshot, salary requirements and date available to Testing Service Corporation, P. O. Box 231, Villa Park, Illinois.

Redevelopment project planning experience, plus a degree in city planning, architecture, landscape architecture, civil engineering, economics or sociology. Experience in the Federal urban renewal program is essential. Position: Planner LV. Salary: $6678 per annum. Apply: James F. Reynolds, Executive Director, Providence Redevelopment Agency, City Hall, Providence 3, Rhode Island.

Assistant to Contractor with some engineering ability and varied experience in Heavy Construction. Growing concern located in Southern Connecticut. Resume and Salary required to P-7529, Engineering News-Record.

Superintendent capable of handling hospitals, schools & light commercial work for young Alabama Contractor. Excellent opportunity. P-7528, Engineering News-Record.

Paving Supt. wanted for Highway Work in South Eastern Penna. State fully experience, type of paving, etc. P-7531, Engineering News-Record.

Chief Engineer: City of Middletown, Ohio, invites applications. Registration as a professionel engineer in State of Ohio, required. Salary starting $7820.80 per year with increase after six months and each year thereafter for next three years to final salary of $9360.00 per year. Also fringe benefits. Contact Director of Public Service, P.O. Box 530, Middletown, Ohio.

Civil Engineer: City of Middletown, Ohio, invites applications. Registration as a professional Engineer in the State of Ohio required. Salary starting $6843.20 per year with increase after six months and each year thereafter for next three years to final salary of $8132.80 per year. Also fringe benefits. Contact Director of Public Service, P.O. Box 530, Middletown, Ohio.

Superintendent—Complete knowledge of road construction and bituminous paving. Must be able to estimate and take charge of complete road job. Year around position with reliable construction company in central New York. P-7538, Engineering News Record.

Wanted—Construction Engineer to handle jobs from bid to completion. Bridges and highways. New York area. P-7537, Engineering News-Record.

EMPLOYMENT SERVICE

Better Positions—$6,000 to $35,000. Want a substantial salary increase, more opportunity or different location? This national 17 year old service connects you with best openings. You pay us only nominal fee for negotiations: This we refund when employer pays placement fee. Present position protected. In complete confidence, write for particulars. R. W. Bixby, Inc., 559 Brisbane Bldg., Buffalo, N. Y.

POSITIONS WANTED

Construction Superintendent now employed desires job with general contractor on estimating, sub-contractors, shop drawings, scheduling, costs, etc. PW-7034, Engineering News-Record.

Equipment Superintendent-Master Mechanic experienced in the supervision of all phases of shop management, repairing, maintenance and operation of large fleets of earth moving equipment, paving spreads, erection of asphalt or concrete plants. Presently nearing completion of contract in middle East Country, best of references, resume on request. PW-7128, Engineering News-Record.

Superintendent (carpenter) Formwork, reinforced concrete, bridges, hospitals, railroad terminals, schools, treatment plants, 11 years general construction supervision experience. Age 35. Will locate Los Angeles California vicinity. PW-7388, Engineering News-Record.

Construction Supt.—BSCE, 40, 20 years exp., now employed, desires job with general contractor. Field supervision, scheduling, labor relations, cost analysis, direction of subcontractors on industrial and chem. plants and public buildings. PW-7356, Engineering News-Record.

Cost Engineer—Civil, Architectural. Experienced construction cost all types of heavy and light structure. Desires full time or short term connection as cost consultant with Arch-Eng'r construction firm. Multi: plant owners, foreign, domestic assignments. PW-7451, Engineering News-Record.

Consulting Civil Engineer, office in South Florida desires to represent national engineering firm in Florida and Caribbean area. PW-7422, Engineering News-Record.

Construction Supt. General Constr. PW-7186, Engineering News-Record.

Graduate Structural Engineer (English). Sound knowledge of reinforced concrete-construction, detailing, design and estimating. Experience on buildings, bridges, airfield pavements and associated facilities. Present position 4 years in Nth. Canada with U.S. Government. Desires to relocate due forthcoming marriage. Field or office position. Versatile and conscientious. PW-7508, Engineering News-Record.

Chief Draftsman, Civil, Age 35, 13 yrs. Exp. All phases, structural, highways, subdivisions. PW-7532, Engineering News-Record.

Construction Executive Superintendent 30 years experience all phases. Top man in organizing every type of project. A work planner not just an ordinary Supt. Florida or W. Indies. P.O. Box 3771, Sarasota, Fla.

Civil & Structural Engineer, 35, European background, German degree, 6 years U.S. experience in design of ind'l bldgs. U.S. citizen. Languages: English, German, Serbo-Croat, French. Desires position abroad. PW-7498, Engineering News-Record.

Piping Engineer, 54, experienced Industrial Process Piping, Plumbing, Heating, Design, Supervision or Sales. Will relocate. PW-7535, Engineering News-Record.

(Continued on page 193)

STRUCTURAL

ENGINEERS
DESIGNERS
DRAFTSMEN

Prefer several years or more experience in any of these fields:

BRIDGES

BUILDINGS
EXPRESSWAYS
HYDRO PROJECTS
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Will consider lesser experience with good educational background, including several recent graduates to round out a planned expansion program. Occasional openings for combination field men. These are permanent additions to our regular staffs.

We are professional engineers engaged primarily in design which covers a wide scope of practice. The variety and unusual character—for example, the proposed world's largest bridge project—offer excellent opportunity for professional development and advancement.

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General Contractor will add to expanding organization man qualified for large projects run independently of main office. Should be thoroughly experienced in both field supervision and estimating to handle smaller jobs, as is sometimes necessary, with minimum of field help. Man wanted is not the "Project Manager" type, but one not afraid of the hard work required to meet costs on lump sum contracts. Well paid and continuous employment. Work generally in Eastern half of this country. Give full resume in reply, particularly records of cost and schedule compliance.

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Graduate design engineers experienced in soil mechanics. Must have a minimum of two years recent qualifying experience in the design of earth dams and embankments.

Graduate field engineers with at least two years recent experience in soils mechanics, field control and laboratory operations in earth dam and embankment construction.

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Manager of Employment and Placement

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CORPORATION
220 Bush Street
San Francisco, California

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B.S. or M.S. degree Industrial or Mechanical Engineering preferred with 5 years industrial engineering experience including 2 years supervisory capacity. Should have extensive experience methods engineering, material handling, time study, wage incentive, and job evaluation.

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for underground mine operations. B.S. degree in Mining Engineering required and at least 3 years underground metal mining experience and year in supervisory capacity. Interested principally in individuals with qualifications for future advancement.

Excellent opportunities large copper company, Chile, South America. 3 year contract, transportation both ways and salary while traveling paid by Company. In reply give complete details.

P-7511, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

SALES REPRESENTATIVE

or dealers wanted to sell concrete saw blades direct to road-builders and general contractors. Tremendous repeat sales . . . high commissions . . . provide an exceptional opportunity if you are now selling to concrete paving contractors. Submit complete data including territory covered. All replies confidential.

RW-7347, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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Sales engineer to promote forming systems for concrete construction with architects, engineers, contractors, govt. agencies. Extensive experience in forms design, estimating, sales and field work necessary. Send resume.

P-7406, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

Supervisory Construction Personnel

Preferably graduate engineers with primary experience in hydro electric construction. Needed by company with long range hydro and thermal construction program. Location in Southeast. Submit resume, salary requirements and references.

P-7466, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

GRADUATE CIVIL or ARCHITECTURAL ENGINEERS

We are looking for a young, recent college graduate, with a degree in either architectural or civil engineering, for a position in our El Paso, Texas—Estimating Department. This position provides a training ground for our future superintendents and executives. It is an excellent opportunity for a young man to obtain a desirable position with a reliable firm doing all types of construction work.

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P-7501, Engineering News-Record,
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

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With background of experience in the installation of pumps, compressors & turbines, and inspection of same in fabricators' shops. Oil refinery and chemical plant maintenance experience on this type of equipment helpful. Work includes check of as-built equipment against purchase specification, observation of tests and ability to approve shop performance test data. Extensive travel required from headquarters office, New York City.

Send complete confidential resume including experience & education to:

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P-7524, Engineering News-Record
520 North Michigan Ave., Chicago 11, Ill.

An employment advertisement in this EMPLOYMENT OPPORTUNITIES section will help you find the engineers you need. It's an inexpensive, time saving method of selecting competent personnel for every engineering job.

POSITIONS WANTED
(Continued from page 191)

Structural—Architectural Engineer, Age 28, B.S., married, 2 children. 7 yrs. experience in all phases of industrial, commercial & institutional bldg. design, working dwg's, spec. writing & supervision. Also hydroelectric, plant layout, materials handling & estimating. Excellent references. Desire to locate in South or Southeast with progressive Architectural or consulting firm, contractor or as plant engineer. Salary negotiable. Resume upon request. PW-7546, Engineering News-Record.

Civil Engr. and Surveyor, Registered in Ohio. Age 30, 4 yrs. exp. with steel fabricator, 4 yrs. with consultant. Subdivisions, sewers, water, paving, structural, municipal, all phases. Prefer Far West or Southwest. PW-7543, Engineering News-Record.

Hoisting Engineer would like position as equipment superintendent or master mechanic, abroad, Europe, or U.K. 28 years experience on all types of equipment, and projects, good pusher. PW-7548, Engineering News-Record.

WORK WANTED

Structural drafting, shop drawings, computations, models, perspectives. Alexander's, 310 Turner Place, Ithaca, N. Y.

Structural Designers P.E.'s, contract or per diem, your office or ours, N.Y.C. WW-7390, Engineering News-Record.

SEARCHLIGHT Equipment Spotting Service

This service is aimed at helping you, the reader of "SEARCHLIGHT", to locate Surplus new and used Engineering and Construction equipment *not currently advertised.* (This service is for USER-BUYERS only). No charge or obligation.

How to use: Check the dealer ads to see if what you want is not *currently* advertised. If not, send us the specifications of the equipment wanted on the coupon below, or on your own company letterhead to:

Searchlight Equipment Spotting Service

c/o ENGINEERING NEWS-RECORD
330 W. 42nd St., N. Y. 36, N. Y.

Your requirements will be brought promptly to the attention of the equipment dealers advertising in this section. You will receive replies directly from them.

Searchlight Equipment Spotting Service
c/o ENGINEERING NEWS-RECORD
330 W. 42nd St., N. Y. 36, N. Y.

Please help us locate the following equipment components.

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$2.40 a line, minimum 3 lines. To figure advance payment count 5 average words as a line.

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DISCOUNT of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

Send NEW ADVERTISEMENTS or Inquiries to Class. Adv. Div. of Engineering News-Record, P. O. Box 12, N. Y. 36, N. Y. April 3rd issue closes March 24th

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BO-7522, Engineering News-Record
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A LARGE AUCTION
CONSTRUCTION EQUIPMENT
WEDNESDAY, APRIL 2, 9:00 A.M.
COLUMBUS, OHIO

LOCATION: The sale will be held at the Columbus Branch yard of the RISH EQUIPMENT COMPANY at 3131 Beulah Road, just 4 miles from downtown Columbus.

NOTE: The RISH EQUIPMENT COMPANY, (International Dealers with branches at 14 locations in Ohio, Virginia and West Virginia), is selling a large portion of its used equipment inventory in this Auction. Each and every piece of equipment in the sale belongs to Rish Equipment Co. Many of these equipment items have been completely rebuilt at the unique Rish Assembly-line rebuilding shops at Princetown, W. Va.

EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT, MINIMUM OR RESERVATION! ! !

Approximately 275 equipment items will be sold, including the following categories:

Approx 25 Air Compressors. 60 cf to 365 cf.
Approx 6 Ditching and Trenching Machines
Approx 13 Power Units
Approx 37 IHC Tractors & Crawler-Loaders. T-6; TD-6; T-9; TD-9; TD-14; TD-18; TD-24.
Approx 20 Cat Tractors. D-2; D-4; D-6; D-7; D-8.
Approx 8 AC Tractors & Crawler-Loaders. HD-5; HD-6; HD-9; HD-19; HD-20.
Approx 7 Other Crawler Tractors & Loaders. Oliver; Terra-Trac; J. D.
Approx 9 Hough Payloaders. Nearly all sizes.
Approx 11 Motor Scrapers & Full Scrapers.
Approx 19 Wheel Tractors. Many with Loaders and Backhoes.
Approx 10 Cranes, Draglines & Truck-Cranes. Also Attachments & Buckets.
Quantities of other items including Graders; Bucket Loaders; Forklifts; Generators; Rollers; Mixers; Trucks; PCU's; Vibrators; Pumps; Saws; Heaters; Hoists; Winches.

WRITE-WIRE-CALL Auctioneers for complete Descriptive List that will Include All Items to be sold. INSPECT the equipment the week prior to sale date at the sale site.

NOTICE: In this sale, as in all Forke Brothers Auctions, each piece will positively be at the sale and each piece will positively sell to the highest bidder without 'Buy-Backs', 'Bid-ins', or any other subterfuge. This is a completely honest and legitimate Auction and neither the Rish Equipment Co., The Auctioneers, nor any of their representatives will bid on any item! ! !

EACH PIECE POSITIVELY SELLS TO THE HIGHEST BIDDER WITHOUT LIMIT, MINIMUM OR RESERVATION! ! !

If you are in need of any of the above categories of equipment, no not fail to contact the Auctioneers for a complete, descriptive list. This is a fine opportunity to purchase a wide variety of very good heavy equipment items at auction. Attend the sale prepared to buy!!

RISH EQUIPMENT COMPANY (International Equipment Dealer) Owner

FORKE BROTHERS
the Auctioneers

321 Sharp Bldg. **Lincoln, Nebraska** Phone 2-1048

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4—Euclid 23TDT—3 years old—excellent rubber. G. M. 6-110 Engines, Allison Torque Convertors.
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2—7TDT-14SH Euclid Scrapers—6 wheel Cummins Engines.
3—Mod. "D" Le Tourneau 6 yd Scrapers. G. M. 671 engines. 2 machines have cabs—1 machine overhauled and recapped drive tires.
1—Slightly used 88-1B Parsons Trencher—Rubber tired ladder type machine used 2 mos. $7,500.00. LIKE NEW!
2—HD 20 A.C. Tractors, excellent condition. Straight Dozers.
1—1201 Lima 3½ yd. Dragline and shovel front—TOP SHAPE—$45,000.00.
1—605 Koehring 1½ yd. Dragline—Rebuilt—$27,500.00.
1—Euclid S7—Demonstrator—A real buy, like new, $21,500.00.
1—L41 Lorain ¾ yd. Shovel—Backhoe—Dragline, $14,000.00.

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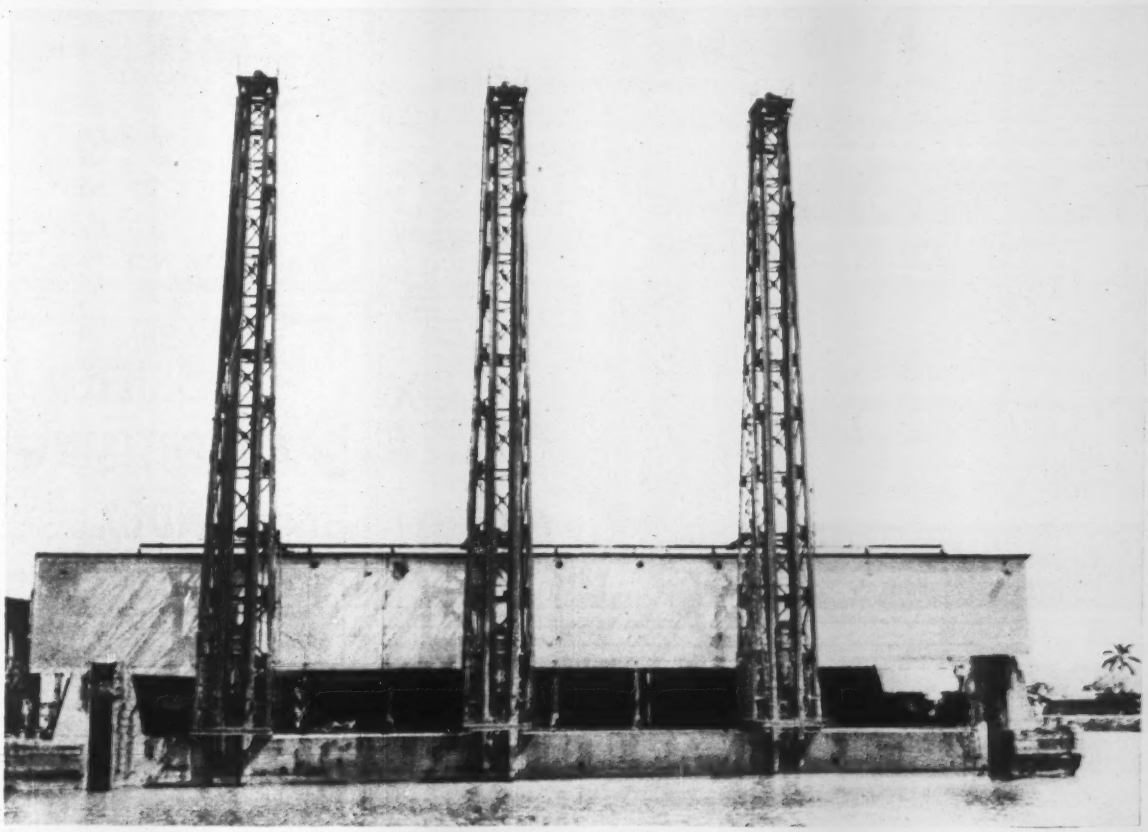

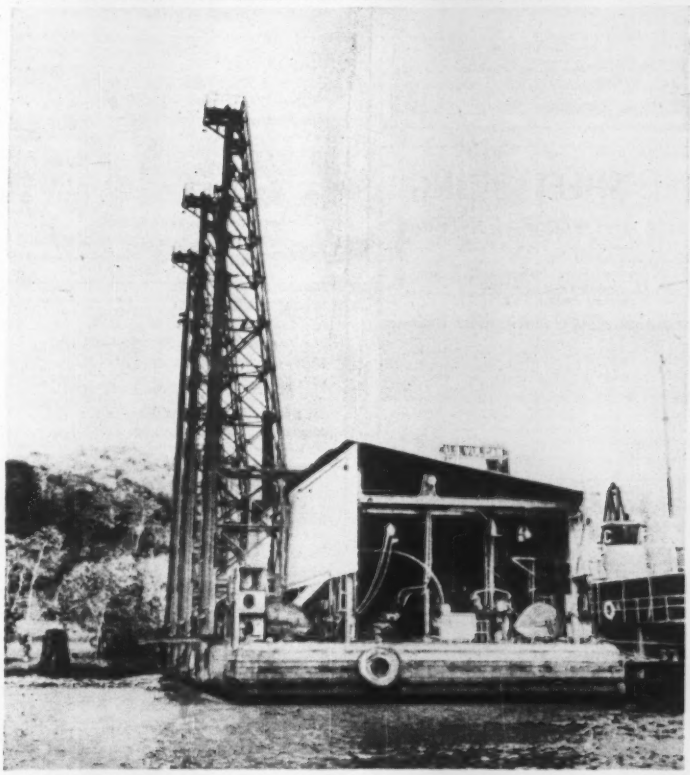

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Sealed bids will be received in the office of Chief, Procurement Division, Panama Canal Co., 21 West St., New York 6, N. Y., until 10:30 A.M., EST June 27, 1958 and will at that time be publicly opened for the purchase of one drillboat, U. S. VULCAN offered for sale by Panama Canal Company. This ship was designed for underwater drilling and mining operations. Length 151 feet, beam 52 feet, depth 13 feet, displacement 1,430 long tons. Has four IR model 8XVO diesel engine air compressors, three drill towers, pneumatically operated, 94 feet high, 70,000 pounds each. Can drill 5 inch holes to depth 75 feet below water line. Superstructure is sound, finish is fair. Last drydocked June, 1949, it is considered seaworthy.

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Recession Remedies

JUST A YEAR AGO on this page, the following statement appeared: "Public Works form a tempting target this year to an economy-minded Congress that has promised to pare the record peacetime budget." And public works appropriations were indeed pared. The editorial went on to say that "curtailment of public works may be false economy." And that false economy is now becoming apparent.

At the time, the need was for an orderly public works program that would adequately service a growing economy. That need is still existant, and it should not be lost sight of today as Congressmen rush to outdo one another in proposals to use public works to halt a recession.

It will soon become apparent that public works can't be turned on and off like water from a faucet. It takes time to draw up plans, buy land, award contracts and get construction started. Had an orderly, adequate program been approved last year, much of this preparatory work would be behind us, and employment and payrolls would now be benefiting.

The best that can be done now is what Congressmen and the Administration are proposing: Speed up the highway program, push post office modernization, make mortgage borrowing for housing easier and let held-up water resource projects go ahead. All of these activities are in line with the nation's needs, and so are justified regardless of recession.

It is just possible that the ample amounts of credit now available from the banks and lending institutions, as a result of the Federal Reserve's money-management action, may spark the necessary upturn in business. Lessened inventories of goods and speeded-up defense spending must necessarily cause industrial production to turn up. Consumer purchasing power, despite the five million unemployed, is not drastically impaired, and could exert a powerful influence if it can be loosed by a little more confidence.

The point is that, if business should improve, Congress would be tempted again to return to curtailment, when it should look to the country's future needs and keep an orderly, adequate public works and financial-aid program going. The highway program, originally considered as a 10 year effort, has had to be stretched to 16 years because of inadequate funds. It should be returned to the original schedule for the good of the country and the economy. We need upwards of a million-and-a-half new housing units every year, and means to perpetuate such a program should be built into the economy.

Water resource development and sanitation facilities are a continuing need, and not something to be held back for hard times. School construction, so far strangely absent in Congressional emergency proposals, is far behind our basic needs, and even farther behind if the recent concern over our educational processes in comparison with Russia's is to be taken seriously. Regardless of recession, these are needs that must be satisfied.

Congress and the Administration are studying recession remedies with great responsibility, despite the political maneuvering that makes some of the proposals suspect. They will no doubt come up with a program that will be beneficial in ending the present recession. But they should plan also beyond the present, and the decision should be in favor of programs of national development that will be continuously responsive to the nation's needs, and not of the all-too-familiar off and on variety.

Costs Favor Building Now

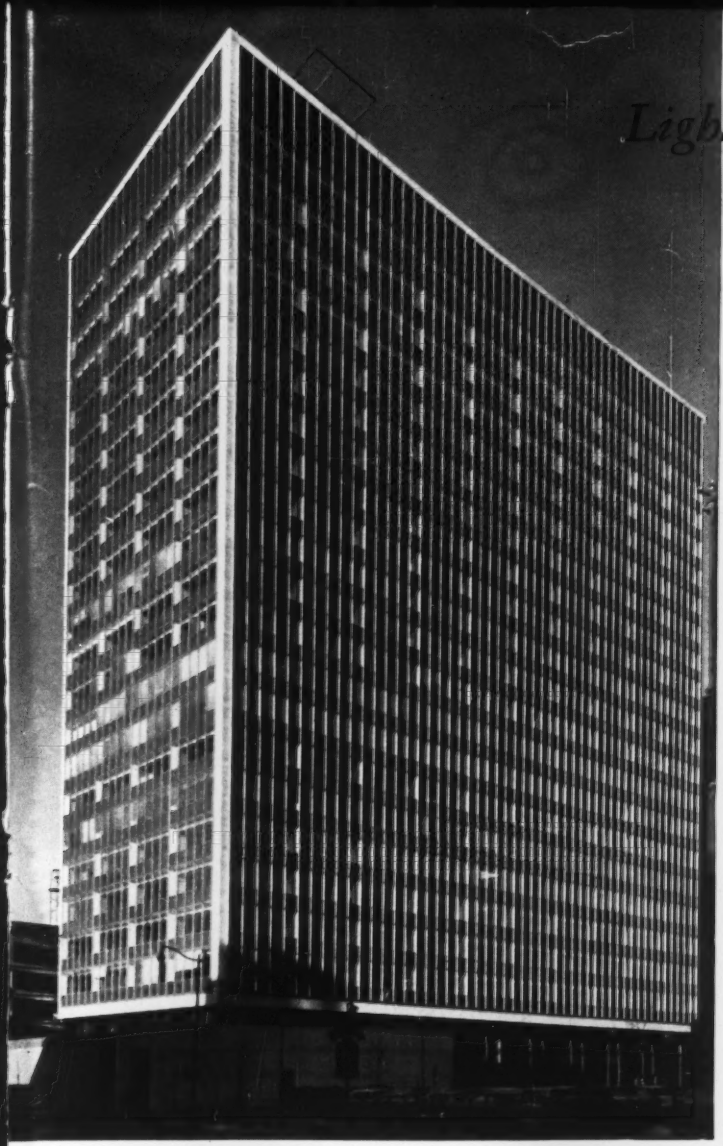
ANYONE WHO WAITS for the current recession in business to bring building costs down before he undertakes a needed project is almost certainly doomed to disappointment. With wage rates fixed or rising, and materials prices showing no signs of softening, the only downward pressure on costs is from contractor competition, which cannot go farther and leave any profit in the job. Construction costs, therefore, are not apt to go lower.

The real need is to assure that the costs, which must be assumed, will be accurately determined and wisely appraised. And it is with this objective in mind that a major part of this issue is devoted to the subject of construction costs—their first quarter levels and their probable trends.

In some respects, estimating and bidding can be done with more assurance than for several years past. Not only are material prices more stable; every conceivable material is in ample supply. Moreover, it is possible to predict labor costs with fair accuracy. And finally, to serve as guides, there are ample cost records of the recent past, some of which are reported in this issue.

The remaining problem—and it is always present—is to convert and apply these data to the job in hand. This may mean only the use of index numbers, but it is likely also to require an evaluation of comparative conditions. To cite only one example from an article on hospital framing in this issue, it would be dangerous now to accept without checking its conclusion that steel framing is more expensive than concrete, considering the drop in steel prices that has occurred since this particular analysis was made.

In the months to come, accurate estimating for both design and construction is going to pay off as never before. For under the prevailing favorable condition for the buyer of construction, estimating mistakes can easily be disastrous.



Lightweight Concrete Skyscraper...

concrete with POZZOLITH*

Designers and builders of fine structures such as this $10-million lightweight concrete skyscraper employ POZZOLITH to obtain unmatched performance and lowest cost-in-place concrete.

Here the use of POZZOLITH overcame the harshness and bleeding ordinarily associated with lightweight aggregate concrete — in this case concrete weighed not more than 102 lbs. per cu. ft. Compressive strength averaged 3750 psi with 6 sacks of cement per cu. yd.

POZZOLITH improves concrete quality and reduces the cost of concrete in place by providing three basic controls: control of water content — makes possible lowest water content for a given workability, control of entrained air, and control of rate of hardening.

Any one of our more than 100 skilled fieldmen will be glad to discuss and demonstrate the benefits of these POZZOLITH controls for *your* projects.

Illuminating Building, Cleveland, Ohio. In-construction and completed views.

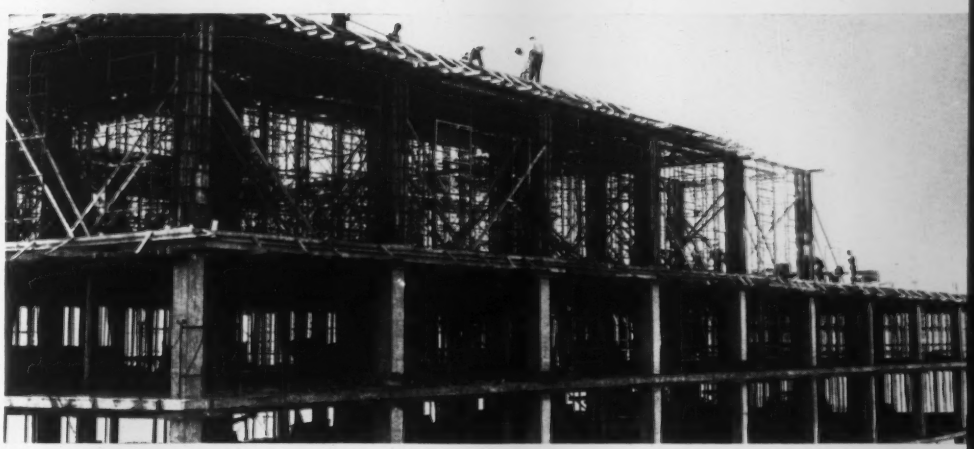
Architects: Carson & Lundin, New York City.

Engineers: McGeorge-Hargett & Assoc., Cleveland.

Contractor: George A. Fuller Co., New York City.

Pozzolith Ready-Mixed Concrete—Cleveland Builders Supply Co.

***POZZOLITH is a registered trademark of The Master Builders Co.**



THE MASTER BUILDERS CO.

DIVISION OF AMERICAN-MARIETTA CO.

General Offices: Cleveland 3, Ohio • Toronto 9, Ontario • *Export:* New York 17, N. Y.

Branch Offices In All Principal Cities • *Cable: Mastmethod, N. Y.*

CHESTER PRODUCTS COMPANY mounts the drum axle of its Model 6060 Tamping Roller on Timken bearings to take all loads, reduce maintenance.

22½-ton tamping roller compacts more dirt per inch, Timken® bearings take all the impact

ROLLING and oscillating its 22½ tons—1450 pounds of pressure psi—this Chester Model 6060 Tamping Roller reportedly compacts more earth per pass than others in its class. But it puts terrific loads on the drum axle. To take the pounding loads, Chester Products Company mounts the drum axle on Timken® tapered roller bearings.

Heavy loads don't faze Timken bearings. Their tapered design lets them take both radial and thrust loads in any combination. And the full line contact between their rollers and races gives Timken bearings *extra* load-carrying capacity.

Timken bearings last longer, too, even under such rugged demands. That's because their rollers and races are case-carburized to have hard, wear-resistant surfaces and tough, shock-resistant cores.

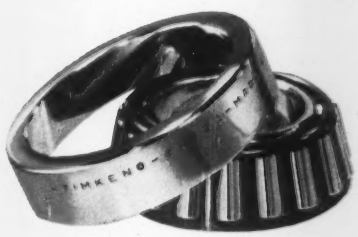
Because earth-rolling machines work constantly in dirt, effective bearing closures are a "must". Timken bearings hold housings and shafts concentric, make closures more effective. Dirt stays *out*, lubricant *in*, maintenance stays *down*.

And Timken bearings virtually eliminate friction. They're geometrically designed, precision made to give true rolling motion. They make it possible for giant rolling equipment like this roller to start and roll easier—keep going with minimum maintenance.

We even make our own bearing steel to be sure it's the best. No other American bearing maker does.

To get all these advantages in the machines you buy or build, specify bearings trade-marked "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.